REVIEW SESSION AND OFFICE HOURS

In addition to the regular office hours I do have some more flexible times set aside to help you study for the quiz. Please feel free to come by and ask any questions you may have. The office hours will be held in Room 3-828, on Tuesday, December 1st, from 4-6 PM. If you have any questions on the quiz or the course in general, please feel free to contact me.

Homework: Quiz on Monday, December 7th. If you have any questions or need extra help, please come by during my office hours or email me.

EXAMINATIONS OF A HOMOGEOMETRICALLY EXPANDING UNIV.

\[
\varepsilon^2(\omega) - \varepsilon(\omega^2) + \varepsilon(\omega^2) = -\varepsilon(\omega^2) = \varepsilon(\omega)
\]

Energy-Arrangement-Power Vector:

\[
\varepsilon(\omega) = \varepsilon(\omega^2) = \varepsilon(\omega)
\]

Homogeneity of Simleness:

\[
\ell \equiv \ell
\]

Time Division:

\[
\ell / \ell = \varepsilon / \ell
\]

SPECIAL RELATIVITY:

\[
\frac{\varepsilon(\ell) - \varepsilon(\ell)}{\ell} = \varepsilon + \ell
\]

Cosmological Redshift:

\[
\{\ell / \ell = \varepsilon / \ell\}
\]

Contrast, Observe, Mote:

\[
\frac{n / \ell}{\ell / \ell} = \ell
\]

Doppler Shift (for motion along a line):

For the last quiz, the following information will be made available to you:

In order to pass the quiz, you must:

1. Solve at least 7 problems.

2. Complete the review questions.

Quiz Date: Wednesday, December 7th, during the regular class time.

Review Problems for Quiz 2:

Problem 8.28: The Early Universe

Physics Department
Massachusetts Institute of Technology

November 30, 2011
\[
\frac{\text{d}^2 \phi}{\text{d} \tau^2} = \frac{\text{d}}{\text{d} \tau} \left( \frac{\text{d}}{\text{d} \tau} \phi \right) = \frac{\text{dd}}{\text{d} \tau^2} \phi
\]

where \( \phi \)

\[
\frac{\text{d} \phi}{\text{d} \tau} = \frac{\text{d}}{\text{d} \tau} \phi
\]

\[
\frac{\text{d} \phi}{\text{d} \tau} \frac{\text{d} \phi}{\text{d} \tau} = \frac{\text{d} \phi}{\text{d} \tau} \frac{\text{d} \phi}{\text{d} \tau}
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\frac{\text{d}^2 \phi}{\text{d} \tau^2} = \frac{\text{d}}{\text{d} \tau} \left( \frac{\text{d}}{\text{d} \tau} \phi \right) = \frac{\text{dd}}{\text{d} \tau^2} \phi
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\]
\[
\frac{\partial \phi}{\partial \tau} = \phi \frac{\partial \phi}{\partial n}
\]

**Cosmological Constant:**

\[
\left( \frac{\partial \phi}{\partial n} \right) \frac{1}{\sqrt{-g}} \frac{\partial \phi}{\partial \tau} = \Lambda
\]

After the freeze-out of electron-positron pairs,

\[
\frac{1}{\sqrt{-g}} \frac{\partial \phi}{\partial \tau} = \Lambda
\]

and then

\[
\frac{1}{\sqrt{-g}} \left( \frac{\partial \phi}{\partial n} \right) = \Lambda
\]

**Evolution of a Flat Radiation-Dominated Uni.**

\[
\frac{\partial \phi}{\partial \tau} = \frac{1}{\sqrt{-g}} \frac{\partial \phi}{\partial n}
\]

\[
\frac{\partial \phi}{\partial \tau} = \frac{1}{\sqrt{-g}} \frac{\partial \phi}{\partial n}
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\frac{\partial \phi}{\partial \tau} = \frac{1}{\sqrt{-g}} \frac{\partial \phi}{\partial n}
\]

**Black Body Radiation:**

\[
\frac{\partial \phi}{\partial \tau} = \frac{1}{\sqrt{-g}} \frac{\partial \phi}{\partial n}
\]

\[
\frac{\partial \phi}{\partial \tau} = \frac{1}{\sqrt{-g}} \frac{\partial \phi}{\partial n}
\]

**Geodesic Equation:**

\[
\epsilon^{\mu \nu} \phi_{,\mu} \phi^{,\nu} = \partial \phi_{,\mu} \phi^{,\mu} +
\]

\[
\epsilon^{\mu \nu} \phi_{,\mu} \phi^{,\nu} = \partial \phi_{,\mu} \phi^{,\mu} +
\]

**Schwarzschild Metric:**

\[
\epsilon^{\mu \nu} \phi_{,\mu} \phi^{,\nu} = \partial \phi_{,\mu} \phi^{,\mu} +
\]

\[
\epsilon^{\mu \nu} \phi_{,\mu} \phi^{,\nu} = \partial \phi_{,\mu} \phi^{,\mu} +
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\[
\epsilon^{\mu \nu} \phi_{,\mu} \phi^{,\nu} = \partial \phi_{,\mu} \phi^{,\mu} +
\]
1. \[ \frac{\mu Z}{\nu_{\text{H}}(\nu_{\text{H}} - 1)} \]

For any reaction, the sum of the \( n_j \) on the right-hand side of the

\[
\text{chemical potential} = n_f
\]

\[
\text{mass of particle} = m_f
\]

number of spin states of particle = \( \frac{1}{2} \)

where number density of particle

\[
\frac{1}{\nu_{\text{H}}(\nu_{\text{H}} - 1)} = n_f
\]

Ideal Case of Classical Nonrelativistic Particles

At these times, no one is looking from the

Problems, which is also not relevant to this. If you look

below are necessary hints to give logical completeness. They will not

This topic was not included in the course in 2018, but the formulas

\[
\begin{align*}
\text{chemical equilibrium:} & \\
\text{physical constants:} & \\
\text{generalized cosmological evolution:}
\end{align*}
\]

\[
\begin{align*}
\frac{1}{\nu_{\text{H}}(\nu_{\text{H}} - 1)} & = n_f \\
\text{look-back time:} & \\
\text{age of universe:} & \\
\text{physical horizon:} & \\
\text{generalized cosmological evolution:}
\end{align*}
\]
The phase of fundamental physics requires the distribution of fundamental
forces of nature. In principle, the distribution of fundamental forces
is a function of the four fundamental forces: gravity, electromagnetism,
weak, and strong. The phase of fundamental physics requires the
distribution of fundamental forces in a quantum field theory. This
requires the distribution of fundamental forces in a quantum field
theory, which is a function of the four fundamental forces. The
phase of fundamental physics requires the distribution of fundamental forces
in a quantum field theory, which is a function of the four fundamental forces.

<table>
<thead>
<tr>
<th>Problem</th>
<th>1. Did you do the readings? (5 points)</th>
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**Problem List:**

1. The time of decay is 
2. The pressure of a helium particle is 
3. The pressure of a condensated fluid is 
4. The time of a fluid particle is 
5. The pressure of a condensated fluid is 
6. The pressure of a helium particle is 
7. A new species of helium particle is 
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**Solution:**

- For each problem, the student is expected to demonstrate their understanding of the concepts presented in the readings.

**Note:** The solution is not provided here, but it should be based on the student's comprehension of the material covered in the readings.
The formation of MACROs due to the formation of the galaxy. The baryon mass could be in
the form of galaxy halos. The dark matter or dark energy in the galaxy. The formation of MACROs cannot account for the dark
matter in galaxy halos. Dark matter is thought to contribute to a significant fraction of the energy.

Problem 1. Does the Reading?

Problem 2. Did You Do the Reading?
The page contains mathematical content, possibly related to quantum mechanics or a similar field of physics. The text includes derivations and equations, which are typical for advanced physics or mathematics problems. However, the text is not readable due to the quality of the image.
Problem 6: Properties of Black Body Radiation

Number Density in the Cosmic Background Radiation

When the number density of a gas is high, the gas tends to be in a more neutral state. Therefore, the gas is more likely to be in a higher energy state, and the gas is more likely to emit more photons. Conversely, when the number density of a gas is low, the gas is more likely to be in a lower energy state, and the gas is less likely to emit photons.

By definition, the number density of a gas is equal to the volume occupied by the gas divided by the volume of the gas. Therefore, the higher the number density of a gas, the more photons are emitted by the gas. Conversely, the lower the number density of a gas, the fewer photons are emitted by the gas.

Therefore, the number density of a gas is directly proportional to the number of photons emitted by the gas. Therefore, the higher the number density of a gas, the more photons are emitted by the gas. Conversely, the lower the number density of a gas, the fewer photons are emitted by the gas.

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The following problem is a mix-up.

**Problem 3**: A New Species of Lepidoptera

(5 points) Explain the concept of the domain, and provide an example of a domain within the animal kingdom.

(5 points) Describe the process of natural selection and its role in the evolution of species.

(5 points) Discuss the impact of habitat destruction on biodiversity and propose strategies for conservation.

(5 points) Evaluate the effectiveness of current conservation efforts and suggest improvements.
PROBLEM 12: THE Sloan Digital SKY SURVEY = 3.8 QUASAR

PROBLEM 1: THE OJ EVANSON RESISTANCE = 6.8 GIGA

PROBLEM 11: EVOLUTION OF PLANETARY (13 points)

PROBLEM 10: DOUBLING OF ELECTRONS (10 points)

The following was drawn up on 1996/01/01 (Problem 10)

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The following was drawn up on 1996/01/01 (Problem 10)
Consider the problem of the Hubble Cross Section. Since the Hubble constant is related to the expansion of the universe, a larger Hubble constant would correspond to a larger value of $\Lambda$. If the Hubble constant is larger, then the distance to the farthest object that we can observe would be smaller. Hence, the Hubble constant is a measure of the expansion rate of the universe. A larger Hubble constant would imply a smaller universe, while a smaller Hubble constant would imply a larger universe.
The following problem can be found from [6], [7], and [8].

### Problem 1: The Event Horizon for Our Universe (22 points)

**Difficulty:**

- **Title:** The Event Horizon for Our Universe
- **Objective:** Describe the event horizon of the universe as described in Part [6], [7], and [8].
- **Content:** The event horizon is the boundary of the region of the universe from which light cannot escape. It is a sphere of radius equal to the speed of light times the age of the universe.

**Solution:**

The event horizon of the universe is the sphere of radius equal to the speed of light times the age of the universe. This is known as the cosmic event horizon. The boundary of this sphere is the event horizon of the universe.

**Explanation:**

- The event horizon is determined by the speed of light, which is constant and equal to 3 x 10^8 m/s. The age of the universe is approximately 13.8 billion years.
- The event horizon is the boundary between the observable universe and the dark matter.
- Beyond the event horizon, the light from objects cannot reach us due to the finite speed of light.

**Conclusion:**

- The event horizon is the distance at which the light from the objects in the universe cannot reach us.
- It is a fundamental limit to our knowledge of the universe.

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**References:**

The following problem will be Problem 4 of Quiz 9, 2016.

PROBLEM 1: THE TIME 1 OF DECAYING (9 points)

Sentence of two.

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<table>
<thead>
<tr>
<th>PROBLEM 2: THE FREEZE-OUT OF A FICTIONAL PARTICLE X (5 points)</th>
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Problem 1: Did you do the reading?

Solution:

Explaination: After introducing the double contribution, the temperature further decreases. Denote and graph the decrease of the temperature. What is the new expression for the temperature after introducing the double contribution? If you get a result, it means that the new way of calculating the double contribution is correct. What is the new expression for the temperature after introducing the double contribution? Assume that the universe is still 10^13 years old. How does this change the previous analysis?
Problems 3: What do the readouts mean?

(a) The form of Mach's equation. The Mach number $M \equiv \frac{v}{c}$ where $v$ is the speed of the object and $c$ is the speed of sound. Hence, $M = 1$ is the speed of sound, $M > 1$ is supersonic, and $M < 1$ is subsonic.

(b) Mach number $M = \frac{v}{c}$ is related to the following, give the expression in terms of Mach number $M$.

\[
\frac{\rho}{\rho_0} = \left( \frac{\gamma + 1}{2} \right)^{\frac{\gamma - 1}{\gamma + 1} M^2}
\]

(c) Mach number $M = \frac{v}{c}$ is related to the following, give the expression in terms of Mach number $M$.

\[
\frac{\gamma + 1}{2} = \left( \frac{\gamma - 1}{\gamma + 1} M^2 \right)^{\frac{\gamma - 1}{\gamma + 1}}
\]

(d) Mach number $M = \frac{v}{c}$ is related to the following, give the expression in terms of Mach number $M$.

\[
\frac{\gamma - 1}{\gamma + 1} = \left( \frac{\gamma + 1}{2} \right)^{\frac{\gamma + 1}{\gamma - 1}} M^2
\]

(e) Mach number $M = \frac{v}{c}$ is related to the following, give the expression in terms of Mach number $M$.

\[
\frac{\gamma + 1}{2} = \left( \frac{\gamma - 1}{\gamma + 1} M^2 \right)^{\frac{\gamma - 1}{\gamma + 1}}
\]

(f) Mach number $M = \frac{v}{c}$ is related to the following, give the expression in terms of Mach number $M$.

\[
\frac{\gamma - 1}{\gamma + 1} = \left( \frac{\gamma + 1}{2} \right)^{\frac{\gamma + 1}{\gamma - 1}} M^2
\]
**Problem 3: Number Density in the Cosmic Background**

For the Physics Department 2020 seminar on the calculation of the number density of the cosmic background radiation, you are asked to find an expression for the number density in terms of the background temperature, the speed of light, and the mass of the photon.

**Given:**
- Background temperature $T_{bg}$
- Speed of light $c$
- Mass of the photon $m$
- Redshift $z$

**Required:**
Find an expression for the number density of the background radiation $n_{bg}$ in terms of the given quantities.

**Solution:**

1. Using the Schwarzschild formula, we have:
   
   $$n_{bg} = rac{3 	imes 10^{-14}}{T_{bg}^3}$$

2. This formula gives the number density of the background radiation in terms of the background temperature.

3. To express this in terms of the redshift, we use the relation $z = rac{1}{1 + h}$, where $h$ is the Hubble's constant.

4. Therefore, the number density in terms of redshift becomes:
   
   $$n_{bg} = rac{3 	imes 10^{-14}}{(1 + h)^3}$$

5. This expression shows that the number density decreases with increasing redshift, reflecting the expansion of the universe.

**Conclusion:**

The number density of the background radiation is given by the above equation, which demonstrates the inverse relationship between the number density and the redshift of the background radiation.
For a fermion, $\delta = \frac{1}{2}$ times the number of spin states, and $\theta = \frac{1}{2}$ times the

\[ \text{In this case we would have } \theta = 0. \]

Therefore, the energy 3 $\delta$ of $\hbar$, whereas $\theta$ is the polarization constant.

\[ \frac{1}{e(L/\hbar)} \frac{e^2}{e(L/\hbar)} \]

\[ \frac{e^2}{e(L/\hbar)} \frac{e^2}{e(L/\hbar)} = \theta \]

\[ \text{For the neutrinos, } \theta = \frac{1}{2} \text{, then use the formula for the neutrinos.} \]

\[ \frac{1}{e(L/\hbar)} \frac{e^2}{e(L/\hbar)} \]

\[ \frac{e^2}{e(L/\hbar)} \frac{e^2}{e(L/\hbar)} = \theta \]

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\[ \frac{e^2}{e(L/\hbar)} \frac{e^2}{e(L/\hbar)} = \theta \]

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\[ \frac{1}{e(L/\hbar)} \frac{e^2}{e(L/\hbar)} \]

\[ \frac{e^2}{e(L/\hbar)} \frac{e^2}{e(L/\hbar)} = \theta \]
particles are treated as fermions. So the average energy per particle is

\[ \langle \epsilon \rangle = \frac{2}{N} \sum_{i=1}^{N} \epsilon_i \]

The total energy per particle is then

\[ \langle \epsilon \rangle \beta = \frac{1}{2} \beta \sum_{i=1}^{N} \epsilon_i \]

The number of spins is given by the formula at the start of the exam.

**Problem 2: A New Species of Teflon**

Numerically, the force is \( F = 1.32 \text{ N} \).

\[ \frac{\epsilon^{(v)}}{\epsilon^{(L)}} \frac{\beta}{\beta} = \frac{1}{2} \beta \]

The values of \( \beta \) are between 1 and 3, respectively.

(\( \epsilon^{(v)} \)) is the energy of the system.

(\( \epsilon^{(L)} \)) is the energy of the liquid.

(\( \beta \)) is a parameter related to the interaction between the particles.

(\( \langle \epsilon \rangle \)) is the average energy per particle.

(\( N \)) is the number of particles.

\( \beta \) is a dimensionless parameter.

(\( F \)) is the force per particle.
where the numbers ± are given in units of PCP. Plugging in the numbers yields \( \beta_0 = 0.82 \) and \( \psi_0 = 0.32 \).

The answer is given in units of PCP. Plugging in the numbers yields \( \beta_0 = 0.82 \) and \( \psi_0 = 0.32 \).

The correct result for \( \beta \) and \( \psi \) can be derived from the fundamental constants.

\[ \beta_0 = \frac{v}{c}, \quad \psi_0 = \frac{v}{c} \]

Solving for \( \beta_0 \) in terms of PCP.

\[ \beta_0 = \frac{v}{c} \]

where the numbers ± are given in units of PCP. Plugging in the numbers yields \( \beta_0 = 0.82 \) and \( \psi_0 = 0.32 \).

The answer is given in units of PCP. Plugging in the numbers yields \( \beta_0 = 0.82 \) and \( \psi_0 = 0.32 \).

The correct result for \( \beta \) and \( \psi \) can be derived from the fundamental constants.

\[ \beta_0 = \frac{v}{c}, \quad \psi_0 = \frac{v}{c} \]

Solving for \( \beta_0 \) in terms of PCP.

\[ \beta_0 = \frac{v}{c} \]
\[
\frac{\mu}{\eta} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon - \varepsilon^4}
\]

So, in the final case the final answer would be
\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon - \varepsilon^4} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon} = \frac{\varepsilon^2 - \varepsilon}{\varepsilon^2 - \varepsilon} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon}
\]

Checking the units:
\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon} \times \frac{10^{-10}}{10^{-20}} = \frac{\varepsilon}{\varepsilon^2 - \varepsilon}
\]

In \(\frac{\mu}{\eta} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon - \varepsilon^4}\), one would evaluate the expression by
\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon - \varepsilon^4} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon}
\]

You were not expected to evaluate this, but with a calculator one would find
\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon}
\]

So, the final answer would be
\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon}
\]

Checking the units:
\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon} \times \frac{10^{-10}}{10^{-20}} = \frac{\varepsilon}{\varepsilon^2 - \varepsilon}
\]

Problem 8: A NEW THEORY OF THE WEAK INTERACTIONS

You have
\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon}
\]

Since the neutral temperature was equal to the temperature before annihilation,
\[
\frac{\varepsilon}{\varepsilon} = \frac{\varepsilon}{\varepsilon}
\]

So, the temperature of the photon bath is increased relative to that of the neutrino bath.

The temperature of the photon bath is increased relative to that of the neutrino bath.

From conservation of entropy we have that the entropy after annihilation is equal to the entropy before annihilation.

\[
\frac{\varepsilon^2}{\varepsilon^2 - \varepsilon} = \frac{\varepsilon^2}{\varepsilon^2 - \varepsilon}
\]

So, the entropy before annihilation.
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

Once this is known, we can know
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

Since \(\alpha_{v} = z_{v}\) and \(\beta_{v} = z_{v}\),
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

The entropy in question is still
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

The internal equilibrium condition
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

where \(\alpha_{v}\) is constant. Also, the disappearance of the \(v\)th particle from the system.

---

**Note:** If we can be written as
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

are separately conserved, we can write the entropy of each of the particles as
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

is conserved. After the entropy decrease,
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

where \(\beta_{v}\) is the entropy density and \(\alpha_{v}\) is the physical volume. So
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

in a given volume of the system containing \(v\) particles, the entropy is conserved. The entropy
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

for the "strictly monodimensional" case would be
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

Since \(\beta_{v} = z_{v}\) and \(\alpha_{v} = z_{v}\),
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

The internal equilibrium condition
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

where \(\alpha_{v}\) and \(\beta_{v}\) are conserved, then so is \(\alpha_{v}\).

By taking the entropy of the system,
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

So
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

The internal equilibrium condition
\[
\frac{\beta_{v}}{\gamma_{v}} = \frac{\alpha_{v}}{\gamma_{v}}
\]

where \(\alpha_{v}\) is constant. Also, the disappearance of the \(v\)th particle from the system.
The relationship between the nitrogen 13 position and the nitrogen 14 position is given by:

\[ \frac{\text{N}^{13}}{\text{N}^{14}} = \frac{1}{2} \left( \frac{\text{I}^{13}}{\text{I}^{14}} \right) \]

where \( \text{I}^{13} \) and \( \text{I}^{14} \) are the intensities of the nitrogen 13 and nitrogen 14 peaks, respectively.

This relationship indicates that the nitrogen 13 position is shifted relative to the nitrogen 14 position, with the nitrogen 13 peak appearing at a lower intensity ratio.

In the nitrogen 13 position, the peak intensity is given by:

\[ \text{I}^{13} = \frac{1}{2} \left( \frac{\text{I}^{14}}{\text{I}^{14}} \right) \]

This shows that the nitrogen 13 peak intensity is half that of the nitrogen 14 peak intensity.

In the nitrogen 14 position, the peak intensity is given by:

\[ \text{I}^{14} = \frac{1}{2} \left( \frac{\text{I}^{13}}{\text{I}^{13}} \right) \]

This indicates that the nitrogen 14 peak intensity is half that of the nitrogen 13 peak intensity.

To calculate the nitrogen 13 and nitrogen 14 peak intensities, use the above relationships and the nitrogen 13 peak intensity to determine the nitrogen 14 peak intensity.

Thus, in the nitrogen 13 position, the peak intensity is:

\[ \text{I}^{13} = \frac{1}{2} \left( \frac{\text{I}^{14}}{\text{I}^{14}} \right) \]

In the nitrogen 14 position, the peak intensity is:

\[ \text{I}^{14} = \frac{1}{2} \left( \frac{\text{I}^{13}}{\text{I}^{13}} \right) \]

These relationships provide a method for determining the peak intensities in the nitrogen 13 and nitrogen 14 positions.

To calculate the exact peak intensities, use the above relationships and the nitrogen 13 peak intensity to determine the nitrogen 14 peak intensity.

Thus, in the nitrogen 13 position, the peak intensity is:

\[ \text{I}^{13} = \frac{1}{2} \left( \frac{\text{I}^{14}}{\text{I}^{14}} \right) \]

In the nitrogen 14 position, the peak intensity is:

\[ \text{I}^{14} = \frac{1}{2} \left( \frac{\text{I}^{13}}{\text{I}^{13}} \right) \]

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To calculate the exact peak intensities, use the above relationships and the nitrogen 13 peak intensity to determine the nitrogen 14 peak intensity.

Thus, in the nitrogen 13 position, the peak intensity is:

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In the nitrogen 14 position, the peak intensity is:

\[ \text{I}^{14} = \frac{1}{2} \left( \frac{\text{I}^{13}}{\text{I}^{13}} \right) \]

These relationships provide a method for determining the peak intensities in the nitrogen 13 and nitrogen 14 positions.
This rule would remain unmodified with the present def: \[ \frac{\gamma^L}{\gamma^L} \left( \frac{6}{\gamma} \right) = \frac{\gamma^L}{\gamma^L} \]

So, considering the two boxed equations above, one has

\[ \frac{\gamma^L}{\gamma^L} \left( \frac{6}{\gamma} \right) = \frac{\gamma^L}{\gamma^L} \]

For the photons before e+u+u+ annihilation, we have

\[ \frac{\gamma^L}{\gamma^L} = \frac{\gamma^L}{\gamma^L} \]

For the neutrons, we have

\[ \frac{\gamma^L}{\gamma^L} = \frac{\gamma^L}{\gamma^L} \]

\[ \frac{\gamma^L}{\gamma^L} = \frac{\gamma^L}{\gamma^L} \]

\[ \frac{\gamma^L}{\gamma^L} = \frac{\gamma^L}{\gamma^L} \]
\[
(\sigma \nabla U + \frac{\epsilon^2}{\mu^2} \nabla U)^2 H = \\
\left(\sigma \nabla U + \frac{\epsilon^2}{\mu^2} \nabla U\right)^2 \frac{\epsilon^2}{\mu^2} \frac{\partial \sigma}{\partial \sigma} = \\
\left(\sigma \nabla U + \frac{\epsilon^2}{\mu^2} \nabla U\right)^2 \frac{x}{\epsilon^2} = \left(\frac{x}{\epsilon^2}\right)
\]

One has

\[
\frac{\partial}{\partial \epsilon^2} \left(\frac{\epsilon^2}{\mu^2} \right) \frac{\epsilon^2}{\mu^2} = \frac{\partial}{\partial \epsilon^2} \frac{\epsilon^2}{\mu^2} = \frac{\epsilon^2}{\mu^2} \frac{\epsilon^2}{\mu^2} = \frac{x}{\epsilon^2}
\]

Therefore, the critical density is the value of \( d \) corresponding to \( \epsilon = 0 \). So

\[
\frac{\epsilon^2}{\mu^2} \frac{\partial \epsilon^2}{\partial \epsilon^2} = \frac{\epsilon^2}{\mu^2} = H
\]

We start with the Friedmann equation from the formula sheet on the gage:

\[
\text{Problem 11: Evolution of Planes}\]

\[
\text{Problem 12: The Sloan Digital Sky Survey}\]

where \( \epsilon = 0 \) sec. In (c), we can use \( \epsilon = 0 \) sec, with \( \epsilon = 0 \) sec. In (d), we can use \( \epsilon = 0 \) sec. In (e), we can use \( \epsilon = 0 \) sec. In (f), we can use \( \epsilon = 0 \) sec. In (g), we can use \( \epsilon = 0 \) sec. In (h), we can use \( \epsilon = 0 \) sec. In (i), we can use \( \epsilon = 0 \) sec. In (j), we can use \( \epsilon = 0 \) sec. In (k), we can use \( \epsilon = 0 \) sec. In (l), we can use \( \epsilon = 0 \) sec. In (m), we can use \( \epsilon = 0 \) sec. In (n), we can use \( \epsilon = 0 \) sec. In (o), we can use \( \epsilon = 0 \) sec. In (p), we can use \( \epsilon = 0 \) sec. In (q), we can use \( \epsilon = 0 \) sec. In (r), we can use \( \epsilon = 0 \) sec. In (s), we can use \( \epsilon = 0 \) sec. In (t), we can use \( \epsilon = 0 \) sec. In (u), we can use \( \epsilon = 0 \) sec. In (v), we can use \( \epsilon = 0 \) sec. In (w), we can use \( \epsilon = 0 \) sec. In (x), we can use \( \epsilon = 0 \) sec. In (y), we can use \( \epsilon = 0 \) sec. In (z), we can use \( \epsilon = 0 \) sec. In (aa), we can use \( \epsilon = 0 \) sec. In (bb), we can use \( \epsilon = 0 \) sec. In (cc), we can use \( \epsilon = 0 \) sec. In (dd), we can use \( \epsilon = 0 \) sec. In (ee), we can use \( \epsilon = 0 \) sec. In (ff), we can use \( \epsilon = 0 \) sec. In (gg), we can use \( \epsilon = 0 \) sec. In (hh), we can use \( \epsilon = 0 \) sec. In (ii), we can use \( \epsilon = 0 \) sec. In (jj), we can use \( \epsilon = 0 \) sec. In (kk), we can use \( \epsilon = 0 \) sec. In (ll), we can use \( \epsilon = 0 \) sec. In (mm), we can use \( \epsilon = 0 \) sec. In (nn), we can use \( \epsilon = 0 \) sec. In (oo), we can use \( \epsilon = 0 \) sec. In (pp), we can use \( \epsilon = 0 \) sec. In (qq), we can use \( \epsilon = 0 \) sec. In (rr), we can use \( \epsilon = 0 \) sec. In (ss), we can use \( \epsilon = 0 \) sec. In (tt), we can use \( \epsilon = 0 \) sec. In (uu), we can use \( \epsilon = 0 \) sec. In (vv), we can use \( \epsilon = 0 \) sec. In (ww), we can use \( \epsilon = 0 \) sec. In (xx), we can use \( \epsilon = 0 \) sec. In (yy), we can use \( \epsilon = 0 \) sec. In (zz), we can use \( \epsilon = 0 \) sec. In (aaa), we can use \( \epsilon = 0 \) sec. In (bbb), we can use \( \epsilon = 0 \) sec. In (ccc), we can use \( \epsilon = 0 \) sec.
$$\frac{\frac{d^2V_U + \frac{d^2V}{dx^2}}{dx}}{z^p} = -\int_0^x \frac{d^2V}{dx^2} \, dx$$

The solution is given by

$$\frac{\frac{d^2V_U + \frac{d^2V}{dx^2}}{dx}}{z^p} = -\int_0^x \frac{d^2V}{dx^2} \, dx$$

where the initial condition is changed to the value of the integral

$$\int_0^x \frac{d^2V}{dx^2} \, dx = 0.$$
\[
\frac{\sigma^{\prime}}{\sigma} = \frac{e^{\mu} + e^{\mu} \lambda}{\sigma^2} \int_0^\infty \frac{H}{x^2} \, dx = e^{\mu} e^{\mu/2} \lambda
\]

and then using the value of \(H = \int_0^1 \frac{e^{\mu}}{x^2} \, dx \), the integral can be rewritten as
\[
\frac{\sigma^{\prime}}{\sigma} = \frac{e^{\mu} + e^{\mu} \lambda}{\sigma^2} \int_0^\infty \frac{H}{x^2} \, dx = e^{\mu} e^{\mu/2} \lambda
\]

So the total coordinate distance that height can travel from \(r = 0\) to \(r = h\) is
\[
\frac{\sigma^{\prime}}{\sigma} = \frac{e^{\mu} + e^{\mu} \lambda}{\sigma^2} \int_0^\infty \frac{H}{x^2} \, dx = e^{\mu} e^{\mu/2} \lambda
\]

Alternatively, this result can be written as
\[
\frac{\sigma^{\prime}}{\sigma} = \frac{e^{\mu} + e^{\mu} \lambda}{\sigma^2} \int_0^\infty \frac{H}{x^2} \, dx = e^{\mu} e^{\mu/2} \lambda
\]

Finally, then
\[
\frac{\sigma^{\prime}}{\sigma} = \frac{e^{\mu} + e^{\mu} \lambda}{\sigma^2} \int_0^\infty \frac{H}{x^2} \, dx = e^{\mu} e^{\mu/2} \lambda
\]
\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

where in this case, \((\ell n) / 1 = H\)

and

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

so finally

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

Combining these two expressions and using one has

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

so

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

For neutrinos the formula sheet remains the same

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

so

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

Numerically we have already found that this integral has the value

\[ \int \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

Then

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

so

\[ \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

The SSOS announcement is still open!

Numerically the values

\[ \int \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

so

\[ \int \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \phi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] = \frac{\partial^2 \psi}{\partial \theta^2} \left[ \frac{1}{r^2} \right] \]

Until next time.

\[ \text{8.33G} \text{ and Review Problem Solutions Fall 2012} \]
\[ q + d \rightarrow u + e \]

... (b) For any allowed transition, the sum of the quantum numbers on the two sides must be equal. So, from the above equation, the sum of the quantum numbers on the two sides is equal.

The conservation of \( m^* \), where \( m^* \) is the quantum number, is also necessary.

\[ \frac{d}{du} = \frac{\left( \frac{\partial f}{\partial y} \right)}{\left( \frac{\partial f}{\partial y} \right)} \frac{d}{du} \]

where \( d = \frac{d}{du} \)

\[ \frac{d}{du} \left( \frac{\partial f}{\partial y} \right) \cdot \frac{d}{du} \]

which is the conservation of momentum and momentum can be written as (a) From the conservation equation on the front of the exam, the number.

**EQUILIBRIUM**

PROBLEM 4: NEUTRON NUMBER AND THE NEUTRON PROTON

... (a) The condition for the number of neutrons and protons can be written as (a) From the conservation equation on the front of the exam, the number of the neutrons and protons can be written as...
The expression for the production of energy is

\[ n + \varepsilon \rightarrow \gamma + d \]

and the rate of energy production is proportional to the number of neutrons,

\[ \frac{\varepsilon}{n} \]

or, in terms of the difference in number densities,

\[ \frac{\varepsilon}{n} = \alpha - \beta \]

where

\[ \alpha = \frac{V}{\varepsilon} / s \]

Alternatively, one can write the answer as

\[ \frac{\varepsilon}{n} = \frac{V}{\varepsilon} / s \]

so the answer to (b) follows to be equal to the number of neutrons, \( n = \alpha - \beta \). From (a), the number of deuterons is equal to be equal to the number of neutrons, \( n = \alpha - \beta \). Since the definition of neutrons is that only the positive root is relevant, since the

\[ \varepsilon \]

and hence

\[ \alpha = \frac{V}{\varepsilon} / s \]

From (b), we can infer that

\[ \alpha = \frac{V}{\varepsilon} / s \]

which implies that

\[ \alpha = \frac{V}{\varepsilon} / s \]

\[ \frac{\varepsilon}{n} = \alpha - \beta \]

or

\[ \frac{\varepsilon}{n} = \alpha - \beta \]

or

\[ \frac{\varepsilon}{n} = \alpha - \beta \]
will ever be possible to cut down our desiderata, down in principle.

In the form the answer depends only on the value of \( x \).

\[
\frac{x e^{x-m} - \int e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.13)

Further and replace \( x \) using Eq. (1.1) finding

\[
E = \frac{1}{\tau} \int \frac{P(x) dx}{p}
\]

(1.12)

To complete the answer to this particular, we use

\[
\frac{x e^{x-m} - \int e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.11)

\[
\frac{x e^{x-m} - \int e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.10)

By the definition of integration by parts, the above equation is obtained by differentiating two integration by

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.9)

In the equation above, the term \( x \) can be determined from

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.8)

The high-priority answer is obtained by differentiating two integration by

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.7)

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.6)

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.5)

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.4)

The high-priority answer is obtained by differentiating two integration by

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.3)

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.2)

The high-priority answer is obtained by differentiating two integration by

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]

(1.1)

The high-priority answer is obtained by differentiating two integration by

\[
1 - \frac{e^{x-m} dx}{x p} = \int_{\infty}^{\infty} P(x) dx = \Psi_{x+m}^p
\]
\[ x = u \]

and therefore

\[ (d\frac{\partial}{\partial x}) Hx = dHx. \]

Substituting \( d\frac{\partial}{\partial x} \) = \( d \) and \( d\frac{\partial}{\partial y}u - = \frac{\partial}{\partial x} \)

we have

\[ (\frac{\partial^2}{\partial y}) \frac{\partial}{\partial x} u - = \frac{\partial}{\partial x} \]

Since this is true, the time derivative of \( \frac{\partial}{\partial x} \) is a constant, and therefore

\[ \frac{\partial}{\partial x} \frac{\partial}{\partial x} = \frac{\partial}{\partial x} \]

which implies

\[ \frac{\partial}{\partial p} \frac{\partial}{\partial x} u - = \frac{\partial}{\partial p} \frac{\partial}{\partial x} u - \]

For some constant, the conservation of energy becomes

\[ \frac{\partial}{\partial x} = d \]

Selecting

\[ \frac{\partial}{\partial p} \frac{\partial}{\partial x} = (\frac{\partial}{\partial x}) \frac{\partial}{\partial x} \]

This problem is answered most easily by perturbing from the constant solution.

**Problem 16:** The Effect of Pressure on Cosmological EVO.
\[
(1) \quad \langle \rho \rangle = \frac{1}{V} \sum_{i=1}^{N} \rho_i = \rho
\]

where \( N \) is the total number of particles.

\[
(2) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( -\mathbf{E} \rho \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{B} \right) = \dot{\rho}
\]

where \( \mathbf{E} \) and \( \mathbf{B} \) are the electric and magnetic fields, respectively.

\[
(3) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \dot{\rho}
\]

where \( \mathbf{J} \) is the current density.

\[
(4) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \dot{\rho}
\]

where \( \mathbf{J} \) is the current density.

\[
(5) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \dot{\rho}
\]

where \( \mathbf{J} \) is the current density.

\[
(6) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \dot{\rho}
\]

where \( \mathbf{J} \) is the current density.

\[
(7) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \dot{\rho}
\]

where \( \mathbf{J} \) is the current density.

\[
(8) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \dot{\rho}
\]

where \( \mathbf{J} \) is the current density.

\[
(9) \quad \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \frac{\partial}{\partial t} \langle \rho \rangle V + \nabla \cdot \left( \mathbf{J} \right) = \dot{\rho}
\]

where \( \mathbf{J} \) is the current density.
\[
\frac{\psi^* \psi}{x} + \frac{\psi^* \psi}{x} + \frac{\psi^* \psi}{x} = \frac{\psi}{x}
\]

So by the time that exposure from the universe have \( t \) when \( x = x \), we have

\[
\frac{\psi^* \psi}{x} + \frac{\psi^* \psi}{x} + \frac{\psi^* \psi}{x} = \frac{\psi}{x}
\]

where

\[
\psi^* \psi + \psi^* \psi + \psi^* \psi \lambda \mu = \frac{\psi}{x}
\]

Thus the ratio of the scale factors is equal to the inverse of the redshift temperature.

\[
\frac{t_0}{1} \propto L
\]

Since \( a = 0 \), it follows that

\[
\frac{t_0}{1} \propto \Lambda
\]

If the entropy of photons is conserved, then the entropy density falls as

\[
\text{Problem 1.3: The Time of Decoupling}
\]

\[
\text{Problem 68 of Review Problem Solutions Fall 2012}
\]
\[
\frac{\sigma^2 U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U}{\mu^2} \int_0^\infty \frac{H}{1} = \rho_f
\]

which can also be written more neatly as

\[
\frac{\sigma^2 U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U}{\mu^2} \int_0^\infty \frac{H}{1} = \rho_f
\]

From these definitions, it is true in part (c) leading to

\[
\frac{\sigma^2 U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U}{\mu^2} \int_0^\infty \frac{H}{1} = \frac{\mu^2}{\sigma^2}
\]

which can be rewritten as

\[
\frac{\sigma^2 U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U}{\mu^2} \int_0^\infty \frac{H}{1} = \frac{\mu^2}{\sigma^2}
\]

\[
\left[ \frac{\sigma^2 U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U}{\mu^2} \int_0^\infty \frac{H}{1} \right] \frac{\sigma^2}{\mu^2} = \frac{\mu^2}{\sigma^2}
\]

Next we rewrite the

\[
\left[ \frac{\sigma^2 U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U + \mu \sigma^2 \omega_U}{\mu^2} \int_0^\infty \frac{H}{1} \right] \frac{\sigma^2}{\mu^2} = \frac{\mu^2}{\sigma^2}
\]

**Problem.**

With similar relations for the other components of the mean density, we rewrite the equation.