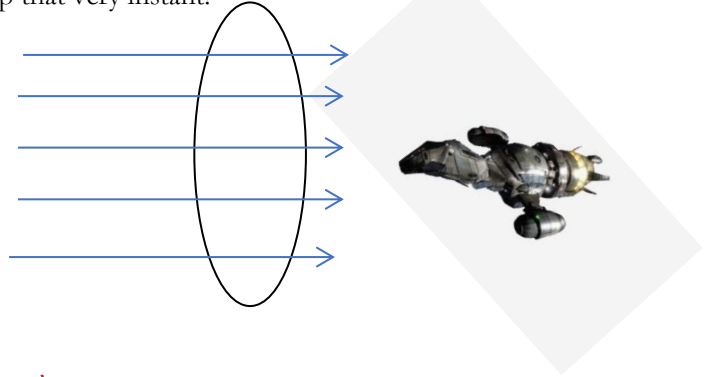


Discussion Week 9 Question 1

Out traveling the 'verse, the Serenity encounters a mysterious conducting material with elastic properties that currently in the shape of a circular loop with radius 10 km. Perpendicular to opening of this loop is an uniform $50 \mu\text{T}$ magnetic field. As Wash pilots Serenity through the loop, the radius of the loop spontaneously contracts at a rate of 500000 cm/s . What emf is induced in the loop that very instant?



Discussion Week 9 Question 2

Ship engineer Kaylee is working with 100 cm of copper wire near a dynamo in Serenity's engines. After forming a circular loop, Kaylee inserts the wire (with cross section radius 10mm) into a region perpendicular to a uniform magnetic field created by the dynamo. The magnetic field increases with a rate 10 cT/s. What is the rate of thermal energy generation in the loop?



Discussion Week 9 Question 3

The Serenity crew end up separated in an abandon research facility that is being overrun by Reavers. River senses the presence of a magnetic field and leads Jayne and Mal to a room with long solenoid of diameter 2 meters. The solenoid has 300 turns in it, while a time varying current runs through the solenoid. If the current is defined by the function $I(t)=20\text{A}+30\text{A/s}\cdot t$, what is the magnitude of the induced electric field 20cm and 300cm from the axis of the solenoid.

