IISERB PHYSICS CLUB

PRESENTS

MODEL SOLVAY CONFERENCE 2021

Problem Statement

Picture yourselves as scientifically inclined denizens of the Earth in a different universe 2niverse, if you will. There has been a groundbreaking discovery in Physics on your planet. Scientists have shown that there exist three different kinds of fundamental charges in 2niverse as opposed to two kinds, positive and negative, in our universe. The following is a table describing the interactions between these charges:

Charges	p	e	s
p	R	A	A
e	A	R	A
s	A	A	R

Here, A denotes attraction and R, repulsion. One thing that 2niverse and our universe have in common is that if you have one of each kind of charge (with equal magnitudes), you will end up with an electrically neutral system.

You and your ragtag group of scientists decide to tackle this problem.

Note that the following guidelines are nothing but an outline intended to give you a direction. You are free to explore the theory at your own choice of physics.

- Formulate a set of mathematically sound equations describing the quantitative nature of the interactions, consistent with the above-mentioned information.
- You were somehow able to get steady currents of each of these three kinds of charges to flow in wires. Perform an experiment to see how these currents affect charged objects in the vicinity. Formulate a mathematical model describing these interactions as well, if they exist.
- What comments can be made about the nature of electromagnetic radiation, if it exists?
- Matter in 2niverse has also been considered to be made of microscopic particles since ancient times by philosophers and scientists from the days of yore. Try to come up with a model for the simplest atom in this universe. Notice that there is no information about the masses of the particles, so feel free to explore as many possibilities as you want to.