

# Dear Colleague Letter: Research on the *Manifold*

## I. PRELUDE

The *Manifold* lab takes place over three weeks, followed by one week of final presentations. It is framed as a game, but the storyline aligns with how physicists actually uncover new knowledge as a professional community. Your entire class will work in tandem to characterize a variety of novel phenomena in the VR lab, collaboratively forming a body of data and explanations for each phenomenon by generating and testing hypotheses.

## II. INTRODUCTION

The *Manifold* is a recent discovery which has granted us entrance into myriad pocket universes, each with its own new forms of matter which obey unique rules for interacting with each other. The four fundamental force laws that govern our universe (see Fig. 1) are known to us, and the force laws of the matter in the *Manifold* seem to exist alongside them. Its discovery has prompted a scientific gold rush; though no matter can be brought back from the *Manifold*, it represents a font of knowledge no research scientist can resist. You are researchers tasked with understanding and cataloguing the force laws that govern the *Pockets* of the *Manifold*.

The National Science Foundation (NSF) supports the exploration of the *Manifold* and offers grants to promising research groups for cutting-edge measurement tools and expanded *Manifold* access.

## III. SCHEDULE

**Lab 4A:** Conduct a hypothesis-generating study of the *Pocket* assigned to your group. Write up your findings as your *Pocket Exploration Grant Report*.

**Lab 4B:** Peer review each others' reports and make revisions. Write a *Pocket Analysis Grant Proposal* describing an experiment testing another group's hypothesis. This proposal will include a budget used to purchase new and upgraded measurement tools.

**November 22:** (Monday of Thanksgiving week) Turn in your revised *Pocket Exploration Grant Report* and your completed *Pocket Analysis Grant Proposal*.

**Lab 4C:** Respond to feedback on your proposal. Carry out your proposed experiment. Write up your findings as an oral presentation in the final week's *Symposium*.

## IV. GRADING

The *Manifold* lab emulates the real-world experience of working as a researcher by focusing on developing knowledge of the *Manifold* through iterative experimentation by your entire class. Thus, effective communication of your findings to other groups is key to your success in this lab.

**This lab, excluding the presentation, is worth 10% of your course grade. Here's how that will break down, out of 3 parts.**

2 parts: *Pocket Exploration Grant Report*.

1 part: *Pocket Analysis Grant Proposal*.

Your final presentation during the *Symposium* will be worth 15% of your final course grade.

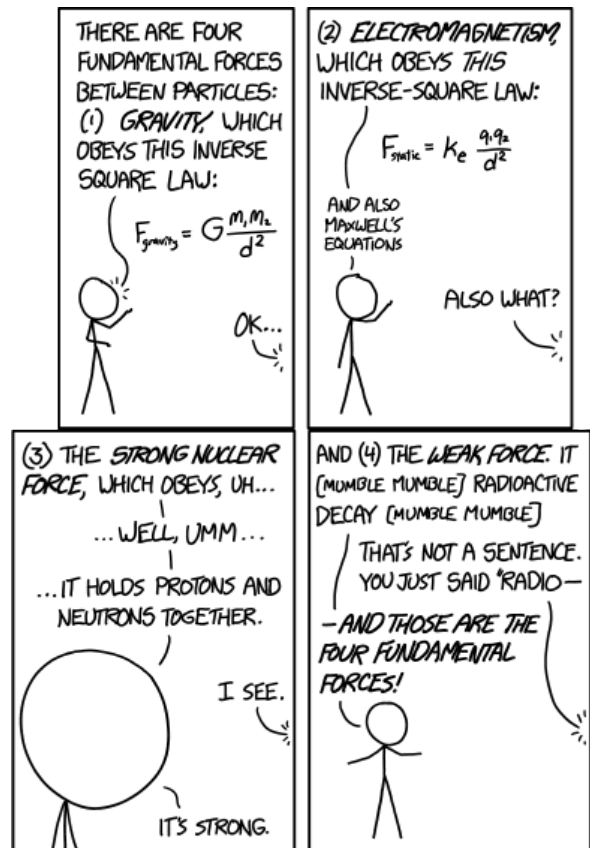


FIG. 1. A summary of the fundamental forces of our universe. Credit: XKCD