2.1: Introduction

This chapter introduces a new physical property of matter: the **electric charge**. As you will see, charged objects can exert forces on other charged objects and even on objects that have no net charge. However, unlike many contact forces often studied in Newtonian mechanics (for example, pushing, pulling, friction, and the normal force), the forces exerted by electric charges can act at a distance from an object with no contact whatsoever! Moreover, the **electric force** can be attractive, like gravity, but also repulsive (Figure 2.1.1). How is this possible?

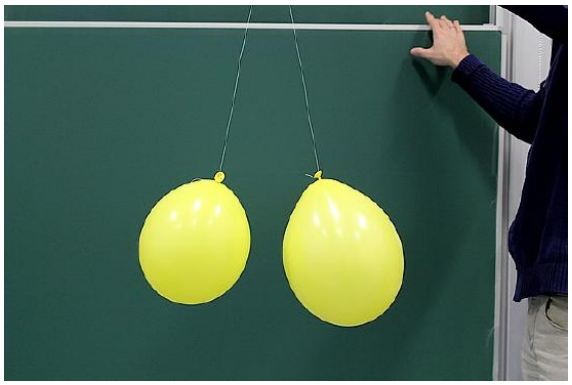

Figure 2.1.1: Repulsive electric forces between two charged balloons. [1]

To explain this effect, we will introduce the concept of an **electric field**. The electric field surrounds the space around an electric charge and enables that charge to interact with other charges throughout space. We will learn how to calculate the electric field and its electric force on the surrounding charge. We will also learn ways to visualize and calculate the electric field for various common distributions of stationary electric charges. Some of these results will prove to be useful in later chapters (for example, the electric field in a parallel-plate capacitor).

References

1. Wikimedia Commons contributors. File:Repulsive-electric-force-between-balloons.jpg [Internet]. Wikimedia Commons. (CC BY-SA 4.0, MikeRun)