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Physics 123 Ferro-Para-Di-Magnetism Magnetism is defined in the dictionary as the class of phenomena exhibited by a magnetic field. In physics there are a few types of magnetism. In this paper only three types will be covered which are ferromagnetism, paramagnetism, and diamagnetism. Ferromagnetism is considered the strongest type of magnetism, as it is a permanent magnet. A permanent magnet is one that remains a magnet after being magnetized by an outside magnetic field. Ferromagnetism is a type of magnetism that produces its own magnetic field that is what makes it unique among the other types of magnetism. Ferromagnetism is often made of iron. Most magnets that we deal with on a daily bases are ferromagnetic. They are ones that produce forces strong enough to be felt. There are types of magnetism that occurs only in the presence of an externally applied magnetic field. This type of magnetism is called Paramagnetism. Paramagnetism is different from ferromagnetism because paramagnets do not retain any magnetization in the absence of an externally applied magnetic field. The reason for this is because of the thermal motion being randomized. Paramagnets are any system that contains ions, molecules, or atoms with unpaired spins. When an external magnetic field is applied, magnetic moments will tend to align themselves in the same direction as the applied field therefore making it stronger. Paramagnetism is not in most materials, however Diamagnetism appears in all materials. Diamagnetism in most cases tends to appose an applied magnetic field and because of this it is repelled by a magnetic field, where as paramagnetism has the tendency to enhance an external magnetic field, and ferromagnetism simply creates a magnetic field. In a diamagnetic material there are no unpaired electrons leading to random motion of electrons. Magnetism in diamagnetism works

due to Coulombs attraction to the nucleus causing a Lorentz force from the magnetic field which leads to an increase or decrease in centripetal force on the electrons, which may pull the electron towards the nucleus or away from the nucleus. This in short increases the orbital magnetic moments and decreases the ones aligned parallel to the field, which results in a bulk magnetic moment with an opposite direction to the applied field. In magnetism we know that all materials are influenced to a greater or lesser degree by the presence of a magnetic field. Some are attracted to a magnetic field like paramagnets, others are repelled by a magnetic field such as diamagnets, and others create a magnetic field, while other have a more complex relationship with an applied magnetic field.