Levitating a graphite rod using the camelback effect

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Abstract

This project aims to investigate the relatively recently discovered "camelback effect" using my knowledge magnetic properties. In a system of two lines of transverse dipoles, the "camelback" field confinement effect can be recreated in a parallel dipole line system (PDL). The "camelback effect" occurs when two rows of magnetic dipoles are aligned to measure the strength of the field along the center axis. The magnetic field is stronger at the center and diminishes away from it. However, if the length of the dipole line exceeds critical length the field get stronger towards the edges of the dipoles and produces a confinement profile on the center axis that looks like a camel's back. This camelback effect can be produced using special cylindrical magnets with poles on the curved side. The effect can also effectively trap an object at the center of the axis along the positive y-axis. A graphite rod can work as the trapped object and will levitate perpetually without any input power as a result of the camelback effect. The graphite rod can also be levitated using a checkerboard of magnets, alternating according to their North and South poles.