

The magnetic moment is a magnetic property of an object. It tells you how much torque will result from an external magnetic field:

$$\vec{\tau} = \vec{\mu} \times \vec{B}$$

The larger the magnetic moment, the larger the torque from the magnetic field.

The torque is perpendicular to both the magnetic field and the magnetic moment.

**Dimensions:**  $[\vec{\mu}] = [\text{torque}/\text{magnetic field}] = [QL^2/T]$

**Current Loop:** For a current loop, the magnetic moment is  $|\vec{\mu}| = IA$ , where  $I$  is the current in the loop and  $A$  is the area. The direction follows the Right Hand Rule.

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When  $\vec{\mu}$  is aligned with  $\vec{B}$  (parallel or antiparallel), then the torque is zero (stable or unstable equilibrium points.)