# Ampère's Law: Magnetic Field Inside a Toroid

Apply Ampère's law, $\oint \vec{B} \cdot d\vec{\ell} = \mu_0 I_C$, to the circular Amperian loop shown.

- Magnetic field inside: directed tangentially with magnitude depending on $R$ only.
- Magnetic field outside: negligibly weak.
- Number of turns: $N$.
- Total current through Amperian loop: $I_C = NI$ ($I$ is the current in the wire).
- Ampère's law applied to circular loop: $B(2\pi R) = \mu_0 NI$.
- Magnetic field inside: $B = \dfrac{\mu_0 NI}{2\pi R}$.