Apply Ampère’s law, \( \oint \vec{B} \cdot d\vec{\ell} = \mu_0 I_C \), to the rectangular Amperian loop shown.

- Magnetic field inside: strong, uniform, directed along axis.
- Magnetic field outside: negligibly weak.
- Number of turns per unit length: \( n \).
- Total current through Amperian loop: \( I_C = nIa \) (\( I \) is the current in the wire).
- Ampère’s law applied to rectangular loop: \( Ba = \mu_0 nla \).
- Magnetic field inside: \( B = \mu_0 nI \).