A Classical Mechanism for Creation of Magnetic Moment in a Particle

V. Nardozza*

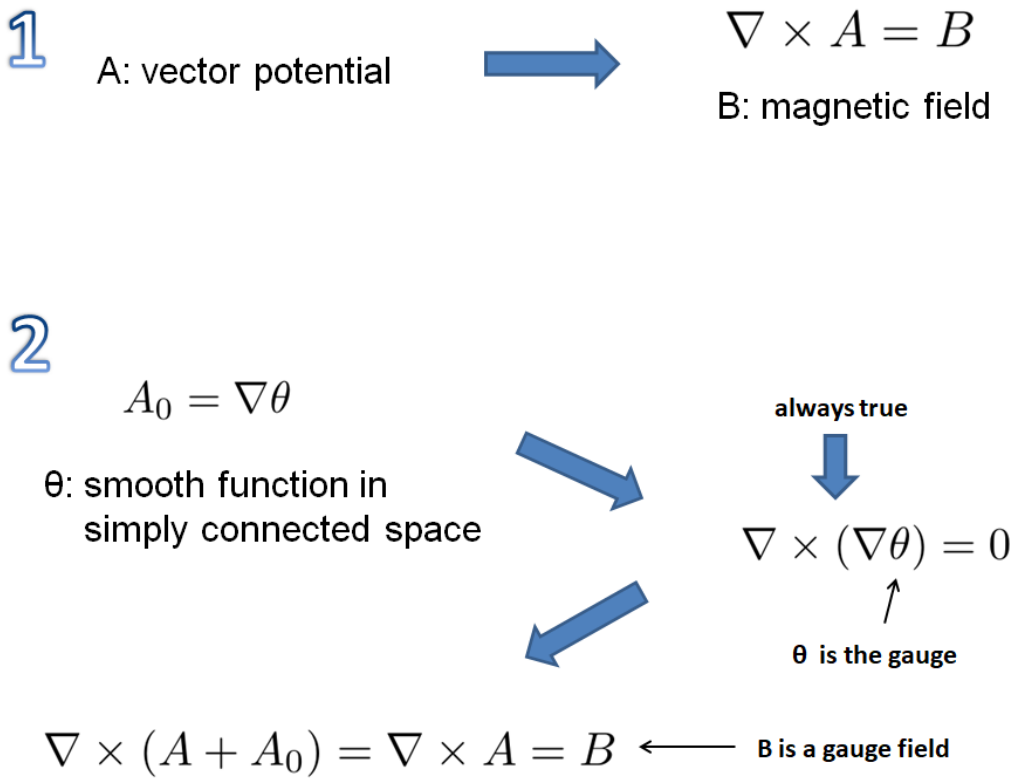
Oct. 2023†

Abstract

We propose a classical mechanism for the creation of magnetic moment in a particle.

Key Words: electrodynamics, gauge theory.

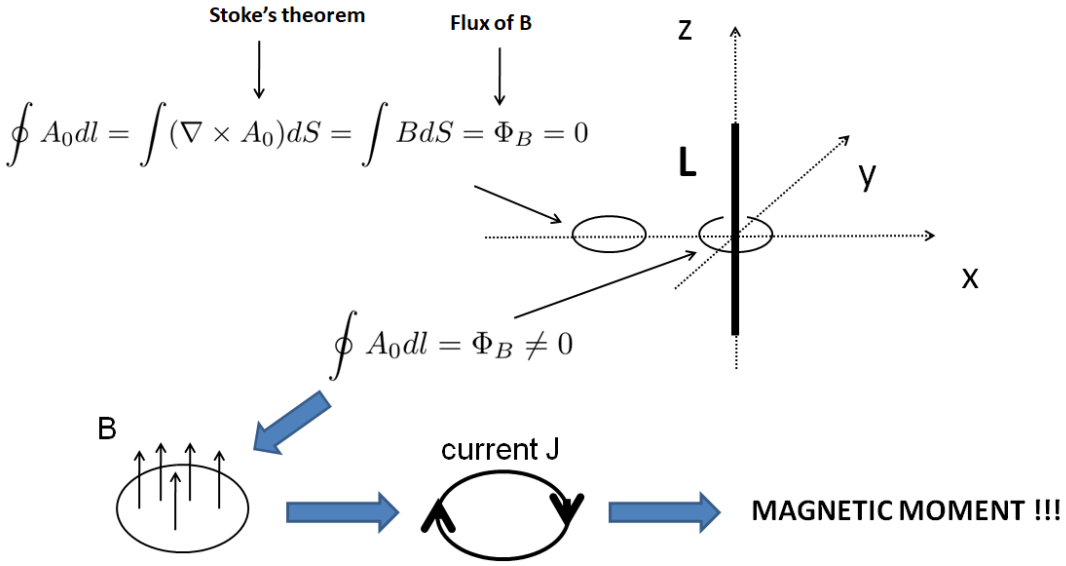
1 Some Facts



*Electronic Engineer (MSc). Lytham, UK. mailto: vinardo@nardozza.eu

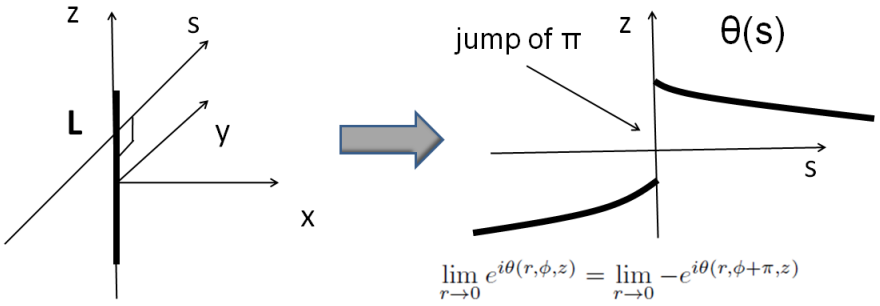
†Posted at: http://vixra.org - Current version: v1 - Oct. 2023

2 Suppose a particle is a line segment discontinuity in space

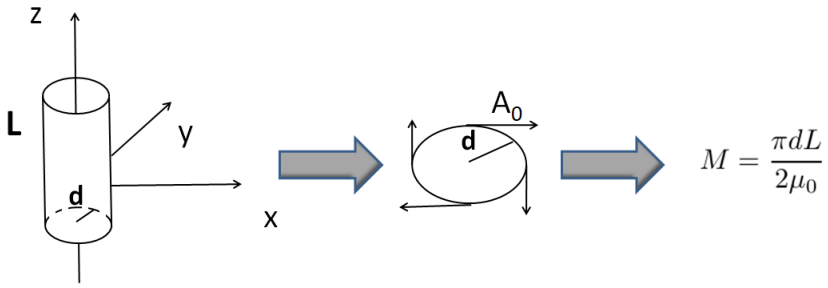


3 Example

We define the following discontinuity:



Making the segment a bit fatter (i.e. a cylinder):



For detailed calculations see [1].

Note that if we assume $r = L \approx d$ (i.e. round particle), from the above result and using the value

of the magnetic moment of the electron we can find r. We have:

$$r_e = \sqrt{\frac{2\mu_0 M}{\pi}} = 8.6 \times 10^{-15}\ [m] \tag{1}$$

Which, taking into account we have used a simplified model, it is not too far from the value of the classical electron radius.

References

[1] V. Nardozza. *Fictitious Currents as a Source of Electromagnetic Field* - https://vixra.org/abs/2310.0031 (2023).