

- 234 (1985); S. Somalwar et al., *Nucl. Instrum. Methods Phys. Res. A* **226**, 341 (1984).
3. J. Incandela et al., *Phys. Rev. D* **34**, 2637 (1986); J. R. Incandela, "A search for magnetic monopoles using superconducting induction detectors," PhD thesis, U. Chicago (1986).
 4. H. J. Frisch, *Ann. NY Acad. Sci.* **461**, 652 (1986).
 5. S. Somalwar, H. Frisch, J. Incandela, *Phys. Rev. D* **37**, 2403 (1988).

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The problem of the electron's mass

As I read "An electron-proton collider could bridge the gap between the LHC and its successor" (PHYSICS TODAY, May 2017, page 29) and how it would serve in high-precision studies of Higgs decays as a portal to new physics, I was disappointed. I saw no mention of a long-standing problem in connection with the electron: What fraction of the electron's mass is due to its interaction

with the quantized electromagnetic field? Despite its enormous success in quantum electrodynamics, renormalization does not solve the problem, nor does it even tell us how to tackle it. Furthermore, the Higgs contribution to the electron's mass is unknown. We also don't know how to measure those respective contributions. Perhaps in thinking about the electron-proton collider, one should be thinking about opening portals to these long-neglected areas as well.

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Energy efficiency in motion and thought

Simon Sponberg's article (PHYSICS TODAY, September 2017, page 34) addresses important topics in the physics of insect locomotion in terms of muscle motion, sensing, and information processing. However, one especially important and astonishing aspect of physics, common to living objects and

unattainable by manmade machines, is the energy efficiency in both muscle motion and information processing. One impressive example is the energy consumed by the human brain in playing Go or chess with a supercomputer. Although humans now lose both games, the energy consumed by the human brain while playing is five to six orders of magnitude less than that of the supercomputer.¹

Reference

1. See, for example, Y. Yanagida, Y. Ishii, *Proc. Japan Acad. B* **93**, 51 (2017).

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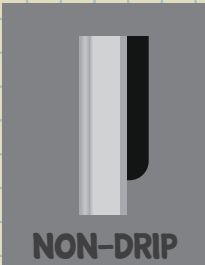
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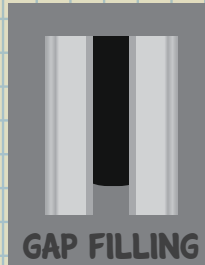
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