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A proposal for a measurement of the nucleon form factors at an asymmetric e^+e^- linac-ring collider

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Abstract: The neutron electromagnetic form factors have been measured for the first time in the time-like region in the Q^2 range between 3.6 and 6 GeV^2 by the FENICE experiment. The results show some unexpected features. First the neutron magnetic form factor turns out to be larger than the proton one, the neutron electric form factor being negligible. Then there are indications of a narrow structure very near the \overline{N} threshold, in the e^+e^- multihadronic annihilation. A new, high statistics experiment is needed to clarify the indications. An asymmetric, unconventional, linac-storage ring collider is proposed, using one of the existing high energy storage ring for positrons and a few hundred MeV linac for electrons. Advantages of this configuration are outlined and a very conservative evaluation of the luminosity that can be achieved is reported.

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