

Abstract Submitted  
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**Mateucci-Pozzi force, Aharonov-Bohm phase and the Ponderomotive AB-effect**<sup>1</sup> HERMAN BATELAAN, SHAWN HILBERT, ADAM CAPREZ, University of Nebraska-Lincoln, BRETT BARWICK, California Institute of Technology — The presence of force for the Mateucci-Pozzi effect, which was once thought to be an Aharonov-Bohm type effect, is demonstrated experimentally. This is contrasted to the absence of force for the Aharonov-Bohm effect as we showed earlier<sup>1</sup>. In this context, it is perhaps interesting to point out that our theoretical prediction of the Ponderomotive Aharonov-Bohm<sup>2</sup> effect can not be explained in a time-averaged picture by a force, but in the time dependent picture is due to a force. To complicate this line of reasoning even more we point out some relativistic issues for the “Feynman paradox” that have not been related before to the Aharonov-Bohm effect<sup>3</sup>. 1. A. Caprez, B. Barwick, and H. Batelaan, “*Macroscopic Test of the Aharonov-Bohm Effect*,” Phys. Rev. Lett. **99**, 210401 (2007). 2. B. Barwick, H. Batelaan, Aharonov–Bohm phase shifts induced by laser pulses, New. J. Phys. **10**, 083036, (2008). 3. A. Caprez, H. Batelaan, Found. Phys. Accepted for publication (2009).

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