Reply to "Comment on 'Spin manipulation of 1.94 GeV/c polarized protons stored in the COSY cooler synchrotron'"

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It seems improper to publish a theoretical Comment about an experimental Article without mentioning the Article's referenced theoretical paper, which derived the equation that the Comment claims is incorrect. Our experimental collaboration declines to offer any opinion about which factor of 2 is correct.

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It seems inappropriate to publish a theoretical Comment [1] about an experimental Article [2] without mentioning in the Comment the theoretical paper [3] referenced in the Article; this paper [3] derived the equation that Ref. [1] claims is incorrect. The authors of [1] now claim to have corrected the errors in their calculations that our collaboration found in their earlier-submitted version of the Comment; we did not check their new Comment for errors.

The factor of 2 disagreement in the equations for the depolarizing resonance strength, between the paper [3] referenced in the Article and the paper [4] supported by the Comment, has no effect on any result in the published experimental Article [2]. We included the below two statements in our two more recent articles [5,6] to stress this disagreement:

(Ref. [24] in [5]) "There is a factor of 2 disagreement between the two references [3,4] for Eq. (4). This disagreement has no effect on our results, since the exact conditions of the Froissart-Stora equation [Eq. (3)] are not satisfied for several reasons."

(Ref. [20] in [6]) "There is a factor of 2 disagreement between the two references [3,4] for Eq. (6); this disagreement has no effect on our results."
One may now consider these statements as Errata or Addenda to Ref. [2].

However, the experimental SPIN@COSY collaboration declines to offer any opinion on which factor of 2 is correct.

SPIN@COSY will instead try to settle such disagreements by obtaining new experimental results, not by calculations. This seems especially appropriate, since a recent compilation of all available data indicates that many data points disagree with the resonance strength equations in both [3] and [4] by factors of 10, 1/10, or even more. Our collaboration will soon submit this compilation for publication [7].

[1] M. Bai, W. W. MacKay, and T. Roser, preceding Comment, Phys. Rev. ST Accel. Beams **8**, 099001 (2005).

[2] V. S. Morozov *et al.*, Phys. Rev. ST Accel. Beams **7**, 024002 (2004).

[3] H. Stockhorst and B. Lorentz, "*Strength and Tunes of an RF Dipole or RF Solenoid Induced Spin Resonance*," COSY Internal Report, 2003 (unpublished).

[4] T. Roser, *Handbook of Accelerator Physics and Engineering*, edited by A. Chao and M. Tigner (World Scientific, Singapore, 2002), p. 153, Eq. (7).

[5] M. A. Leonova *et al.*, Phys. Rev. Lett. **93**, 224801 (2004).

[6] V. S. Morozov *et al.*, Phys. Rev. ST Accel. Beams **8**, 061001 (2005).

[7] M. A. Leonova *et al.* (to be published).