Erratum: Precision Measurement of the n-^{3}He Incoherent Scattering Length Using Neutron Interferometry [Phys. Rev. Lett. 102, 200401 (2009)]

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In the original Letter our correction for the attenuation of the neutron beam due to absorption in the interferometer by the ^{3}He cell contained an error. Because only half of the neutron wave function passes through the cell, the argument of the exponential attenuation should be reduced by a factor of 2; i.e., the attenuation factor is the square root of what it would be for the full neutron beam. Thus in Eqs. 10 and 11 of the original Letter the 2's should be replaced by 1's.

We have applied this correction to our result and it is changed as follows. The spin-dependent real bound scattering length is

$$\Delta b' = b'_+ - b'_- = (-5.610 \pm 0.027 \text{ stat} \pm 0.032 \text{ syst}) \text{ fm}. \quad (1)$$

The real part of the bound incoherent scattering length is

$$b'_i = (-2.429 \pm 0.012 \text{ stat} \pm 0.014 \text{ syst}) \text{ fm}. \quad (2)$$

With the triplet-singlet absorption ratio σ_1/σ_0 factored out we have

$$b'_i = (-2.432(1 - \sigma_1/\sigma_0) \pm 0.012 \text{ stat} \pm 0.008 \text{ syst}) \text{ fm}. \quad (3)$$

The spin-dependent free scattering length is

$$\Delta a' = a'_1 - a'_0 = (-4.202 \pm 0.020 \text{ stat} \pm 0.024 \text{ syst}) \text{ fm}. \quad (4)$$

Our revised result brings us closer to agreement with the previous result of Zimmer *et al.* and further from agreement with the theoretical prediction using AV18 + 3N [1]. Figure 1 shows a summary of a_0 and a_1 in the n-^{3}He system with our revised result.

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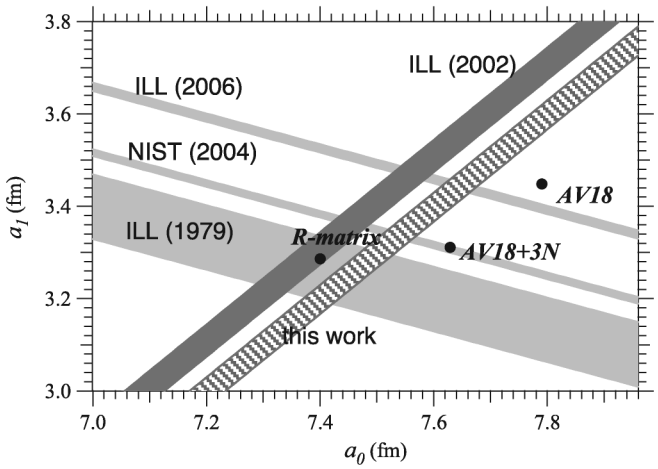

FIG. 1. Summary of the triplet and singlet n-^{3}He free neutron scattering lengths (real parts). The three coherent (unpolarized) measurements labeled ILL (1979) [2], NIST (2004) [3], and ILL (2006) [4] used neutron interferometry. The incoherent (polarized) measurement ILL (2002) [5] used pseudomagnetic spin rotation. The three theoretical points shown are from [1].

