

Abstract Submitted  
for the HAW09 Meeting of  
The American Physical Society

**Precision Measurement of the  $n$ - $^3\text{He}$  Incoherent Scattering Length Using Neutron Interferometry**<sup>1</sup> FRED WIETFELDT, MICHAEL HUBER, Tulane University, TIMOTHY BLACK, University of North Carolina, Wilmington, MUHAMMAD ARIF, WANGCHUN CHEN, TOM GENTILE, DAN HUSSEY, DIMITRY PUSHIN, LIANG YANG, NIST — The low energy neutron- $^3\text{He}$  scattering lengths are important for testing nuclear potential models that include three nucleon forces, effective field theories for few-body nuclear systems, and neutron scattering measurements of quantum excitations in liquid helium. We report the first measurement of the  $n$ - $^3\text{He}$  incoherent scattering length using neutron interferometry:  $b'_i = (-2.512 \pm 0.012 \text{ statistical} \pm 0.014 \text{ systematic})$  fm. This is in good agreement with a recent calculation using the AV18+UIX potential [1], but disagrees with a previous measurement using pseudomagnetic spin rotation [2]. This work also demonstrates the first use of a polarized nuclear target in a neutron interferometer.

[1] H. M. Hofmann and G. M. Hale, Phys. Rev. C **68**, 021002(R) (2003).

[2] O. Zimmer *et al.*, EPJdirect C **A1**, 1 (2002).

<sup>1</sup>Work supported by NSF and NIST.

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Date submitted: 02 Jul 2009

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