

Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Electron interferometry with nano-fabricated gratings¹ HERMAN BATELAAN, GLEN GRONNIGER, BRETT BARWICK, STEPHANIE GILBERT, University of Nebraska-Lincoln — We have realized a three grating electron interferometer. We used free standing, metal-coated gratings with a 100 nm periodicity. Fringes are observed at 10, 8, 6, and 4 keV. Our best observed contrast is about 20 percent. This contrast exceeds our calculated maximum contrast for a Moire deflectometer by a factor of 4 and shows the quantum mechanical nature of this device. Our path integral calculation predicts a maximum contrast of about 40 percent for our experimental configuration. Our contrast does not exceed this value and is possibly limited by interferometer alignment. Our results also confirm our earlier prediction that neither image charge interaction, nor dephasing or decoherence effects prevent the construction of this electron interferometer.

¹Supported by NSF 0112578 and DAAD 1902-1-0280.

Herman Batelaan
University of Nebraska-Lincoln

Date submitted: 16 Mar 2006

Electronic form version 1.4