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Rotation of an optical angular interference pattern in a spiral phase plate etalon YISA RUMALA, AARON LEANHARDT, University of Michigan, Ann Arbor — A spiral phase plate etalon fabricated from a transparent polymer with azimuthally varying thickness and non-zero reflectivity at both surfaces is used to create an optical angular interference pattern on the output plane of the device [1]. The angular interference pattern is observed to rotate as the laser frequency is varied, and compared to a computer model of the experiment based on shot noise limited assumptions. For an ultra-low finesse device, the angular interference pattern is calculated to rotate through a 2π radian angle when the laser frequency is varied by $\sim$100GHz with a sensitivity of a few MHz ($\sim 0.1\pi$ milli radian rotation angle) as determined from fitting the data. This work extends the operation of the conventional Fabry-Perot etalon consisting of longitudinal interference fringes to include angular interference fringes, and is expected to have broad applications in optical frequency metrology, quantum optics and coherent control of atomic systems.

[1] Y.S. Rumala and A. E. Leanhardt, "Multiple beam interference in spiral phase plates", (APS DAMOP) Bull. Am. Phys. Soc. **56**, No. 5, p.170, 2011 (Full manuscript in preparation).

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