Extracting fractional statistics from superperiodic Aharonov-Bohm oscillations EUN-AH KIM, STEVEN KIVELSON, Stanford University —
We consider a quantum Hall interferometer in which the quasiparticles of a fractional quantum Hall (FQH) liquid with filling factor $\nu_1 = 1/3$ propagate around a large ring of radius r_1, which is encircles an island with a smaller radius r_2 occupied by FQH liquid with filling factor $\nu_2 = 2/5$. We study the conductance oscillations that result from the incompressibility of the FQH liquid occupying the island and the constructive interference condition for the quasiparticles encircling the outer ring. Since the constructive interference condition depends on both the magnetic flux enclosed by the encircling path and the statistical phase gained by the encircling quasiparticle due to the presence of quasiparticles in the island, such conductance oscillations can be used to detect signatures of fractional statistics. We find that oscillatory period depends on both radii, r_1 and r_2. We discuss the relation between our results and the recent experiments by F.E.Camino, W. Zhou and V.J. Goldman in the context of our model.

Eun-Ah Kim
Stanford University