Abstract Submitted
for the SES21 Meeting of
The American Physical Society

Realization of Supersymmetry and Its Spontaneous Breaking in Quantum Hall Edges[1] KWOK WAI MA, RUOJUN WANG, KUN YANG, National High Magnetic Field Laboratory — Supersymmetry (SUSY) relating bosons and fermions plays an important role in unifying different fundamental interactions in particle physics. Since no superpartners of elementary particles have been observed, SUSY, if present, must be broken at low-energy. This makes it important to understand how SUSY is realized and broken, and study their consequences. We show that an $\mathcal{N} = (\infty, \prime)$ SUSY, arguably the simplest type, can be realized at the edge of the Moore-Read quantum Hall state. Depending on the absence or presence of edge reconstruction, both SUSY-preserving and SUSY broken phases can be realized in the same system, allowing for their unified description. The significance of the gapless fermionic Goldstino mode in the SUSY broken phase is discussed.

[1]This research was supported by the National Science Foundation Grant No. DMR-1932796, and performed at the National High Magnetic Field Laboratory, which is supported by the National Science Foundation Cooperative Agreement No. DMR-1644779, and the State of Florida.

Kwok Wai Ma
National High Magnetic Field Laboratory

Date submitted: 19 Oct 2021 Electronic form version 1.4