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Abstract for an Invited Paper
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**Quantum Hall Valley Nematics: From Field Theories to Microscopic Models**[1]

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The interplay between quantum Hall ordering and spontaneously broken "internal" symmetries in two-dimensional electron systems with spin or pseudospin degrees of freedom gives rise to a variety of interesting phenomena, including novel phases, phase transitions, and topological excitations. I will discuss a theory of broken-symmetry quantum Hall states, applicable to a class of multivalley systems, where the symmetry at issue is a point-group element that combines a spatial rotation with a permutation of valley indices. I will explore its ramifications for the phase diagram of a variety of experimental systems, such as AlAs and Si quantum wells and the surface states of bismuth. I will also discuss unconventional transport phenomena in these phases in the presence of quenched randomness, and the possible mechanisms of selection between degenerate broken-symmetry phases in clean systems.

References:

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[3] A. Kumar, S.A. Parameswaran and S.L. Sondhi, Phys. Rev. B. **93**, 014442 (2016).

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