Contribution ID: **4** Type: **not specified**

# A Higher-Spin Theory of the Magneto-Rotons

*Tuesday 21 June 2016 11:30 (1 hour)*

Fractional quantum Hall liquids exhibit a rich set of excitations, the lowest-energy of which are the magneto-rotons with dispersion minima at finite momentum. We propose a theory of the magneto-rotons on the quantum Hall plateaux near half filling, namely, at filling fractions $\nu = N/(2N+1)$ at large $N$. The theory involves an infinite number of bosonic fields arising from bosonizing the fluctuations of the shape of the composite Fermi surface. At zero momentum there are $O(N)$ neutral excitations, each carrying a well-defined spin that runs integer values 2, 3,... The mixing of modes at nonzero momentum $q$ leads to the characteristic bending down of the lowest excitation and the appearance of the magneto-roton minima. A purely algebraic argument show that the magneto-roton minima are located at $q\ell_B = z_i/(2N+1)$, where $\ell_B$ is the magnetic length and $z_i$ are the zeros of the Bessel function $J_1$, independent of the microscopic details.

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