Contribution ID: **231** Type: **Talk**

【628】Anomalous Hall Effect in the Quantum Limit in Exfoliated Crystals of the Layered Antiferromagnet Co1/3NbS2

Wednesday 28 August 2019 16:00 (15 minutes)

The anomalous Hall effect (AHE) can arise even in systems without a net magnetization provided that certain common symmetries are absent. Here, we present experiments on the layered antiferromagnet Co1/3NbS2, which exhibits AHE below the Néel temperature TN=29 K in the bulk. Our transport measurements on micro-fabricated devices reveal a pronounced anisotropy in the resistivity –indicative of the two dimensional (2D) character of the electronic properties–and show an extremely large AHE with an anomalous Hall conductance exceeding e2/h per layer at low temperature. This represents the first experimental observation of the AHE in the quantum limit in antiferromagnets, and –given the 2D nature of Co1/3NbS2–suggests the presence of topological bands originating from the magnetic superstructure.

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Session Classification: MaNEP: Correlations and topology in quantum matter

Track Classification: MaNEP Session: Correlations and topology in quantum matter