

MAR07-2006-000729

Abstract for an Invited Paper  
for the MAR07 Meeting of  
the American Physical Society

**Semi-classical theory of the Anomalous Hall Effect**

NIKOLAI SINITSYN, Center for Nonlinear Studies and Computer, Computational and Statistical Division, Los Alamos National Laboratory

The new semi-classical theory of the anomalous Hall effect will be presented. Its goal is to derive all contributions to the Hall conductivity via a strongly simplified approach, based only on the semi-classical Boltzmann equation and wave packet equations of motion. This approach operates only with gauge invariant quantities and thus all expressions acquire a clear physical interpretation. In the diffusive regime the semi-classical approach leads to the same quantitative predictions as the formally exact approach based on the Kubo-formula. I will also discuss the 1-1 correspondence among different techniques applied to the problem of the anomalous Hall effect.