Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

**Hall Effect of Spin Waves in Frustrated Magnets** SATOSHI FUJIMOTO, Department of Physics, Kyoto University — Spin transport phenomena have been attracting much interest in connection with applications to spintronics as well as their fundamental relation with the notion of topologically-induced spin currents. The spin Hall effect in semiconductors and metals, which has been studied extensively, allows for topological interpretation in terms of the Berry phase, and in this sense, it has an origin similar to that of the intrinsic anomalous Hall effect of charge currents. On the other hand, it was shown by several authors that the topological Berry phase is also raised by spin textures, and the Hall effect occurs in itinerant electron systems coupled with a nontrivial spin texture. Here, we propose a possible analogue of this phenomenon for localized spin systems with no charge degrees of freedom. In this scenario, a longitudinal magnetic field gradient induces a spin Hall current carried by spin wave excitations; i.e. Hall effect of spin waves involving no charge degrees of freedom. Our argument is based on a semiclassical analysis of spin dynamics taking into account topological Berry-phase effects. We also present a realistic miscroscopic model of a frustrated magnet with non-coplanar order which exhibits the Hall effect of spin waves.

Satoshi Fujimoto
Department of Physics, Kyoto University

Date submitted: 09 Nov 2009 Electronic form version 1.4