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Magnetic Diffuse Scattering in the Frustrated Square Lattice

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**Abstract:** Some of the first transition metal alloys show first order antiferromagnetic phase transition as a function of alloy concentration [1-5]. The antiferromagnetism of materials can be classified into three different class: type I, type II and type III. Although the neutron diffraction studies give information about the type of magnetism, they do not show the fluctuations of magnetic moment from the original direction. So in order to have some information about this fluctuations one must perform the magnetic diffuse scattering. Recently, we proposed that the square lattice may have a double-Q structure as well as single-Q [6]. We showed that the alloying may cause a first order antiferromagnetic phase transition. In order to show that this is the case we perform the magnetic diffuse scattering and give more evidences that the alloying play the dominant role in this phase transition.

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