Magnetic order of Fe_3O_4 Nanoparticles YANPING CAI, KARINE CHESNEL, MATEA TREVINO, ANDREW WESTOVER, ALEX SAFSTEN, ROGER HARRISON, Brigham Young University, ANDREAS SCHERZ, Stanford University, KARINE CHESNEL RESEARCH GROUP TEAM — Magnetite (Fe_3O_4) nanoparticles tend to self-assemble when they are deposited on a substrate and form a film. Our goal is to understand the magnetic order and magnetic interactions between the particles, when they are self-assembled. After bulk structural and magnetic characterizations previously presented, we have been studying our Fe_3O_4 nanoparticles by using soft X-ray Resonant Magnetic Scattering (XRMS) at synchrotron radiation facilities. This technique utilizes the interaction between magnetic spins and polarized light. [1] The resulting scattering patterns contain information about the magnetic order and magnetic fluctuations in the nanoparticles assembly. By studying the profile of the XRMS patterns, we try to extract the magnetic signal from the charge signal, and learn about the magnetic order between the nanoparticles. We also utilize the coherence of the X-ray light and apply a correlation spectroscopy technique to learn about magnetic fluctuations.

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