Two-photon processes in dense Fe plasma

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A recent opacity experiment performed at the Sandia Z-machine observes opacity larger than calculated by most theory codes. We are investigating whether 2-photon absorption and Raman effects can explain the experimental results. There are many questions about atomic data for high-charge Fe ions, about plasma kinetic theory and about quantum electrodynamics. The increased opacity may be important for modeling temperatures inside the Sun. We hope that future X-ray FEL experiments can test the theory.