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Theoretical Studies on Photoionization Cross Sections of Solid Gold

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Abstract: Accurate expression for photoabsorption (photoionization) cross sections of high density system proposed recently is used to study the photoionization of solid gold. The results show that the present theoretical photoionization cross sections have good agreement both in structure and in magnitude with the experimental results of gold crystal. The studies also indicate that both the real part ε' and the imaginary part ε" of the complex dielectric constant ε, and the dielectric influence function of a nonideal system have rich structures in low energy side with a range about 50 eV, and suggest that the influence of particle interactions of surrounding particles with the photoionized particle on the photoionization cross sections can be easily investigated using the dielectric influence function. The electron overlap effects are suggested to be implemented in the future studies to improve the accuracy of theoretical photoionization cross sections of a solid system.

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