

# Many-Body Atomic Response for Light Dark Matter-Electron Interactions and Low-Energy Solar Neutrino Detection

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Electronic recoil signals are the main observables in direct searches of light dark matter (LDM) and detection of low energy neutrinos. In the energy deposition range of 10 (80) eV to 1 keV for xenon (germanium) detectors, the atomic effects are known to be important. In this talk, I will present a database of response functions for LDM-ionized xenon and germanium, based on relativistic random phase approximation (RRPA), which is a genuinely many-body approach.

For ionization by solar neutrinos, we push the energy range beyond the 30 keV limit of our previous work with RRPA [1] up to 150 keV. The comparison with other simplified methods such as plane-wave approximation and free-electron approximation with stepping will also be discussed.

[1] Jiunn-Wei Chen, Hsin-Chang Chi, C.-P. Liu, and Chih-Pan Wu, *Phys. Lett. B* **774** (2017) 656.

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