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Dark matter pair detection via atomic spectroscopy

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Atomic transitions are among the most studied and precisely measured phenomena in physics, making them an attractive probe for new physics. If dark matter (DM) interacts with electrons, it could trigger electronic transitions via the absorption or scattering of DM with the atom's electrons. The selection rules for these transitions depend on the Lorentz structure of the DM interaction. An interesting case is that of DM interacting via scalar and axial-vector vertices, which induce transitions that are heavily suppressed for photons, resulting in a background-free channel for DM discovery. In this talk we will lay out the fundamentals of these concepts in the case of absorption and scattering of DM pairs.

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