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Light dark matter: Theory and Chemistry

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The search for light dark matter (with a mass below a GeV) is entering an exciting phase. New experiments based on light dark matter interactions with collective modes in various types of condensed matter systems will probe pristine parameter space. Alongside this, new calculational techniques, particularly employing the use of effective field theory, are being developed to accurately describe the dark matter interaction and detector response. On the theory side, I will present curious features that show up in the calculations of dark matter interacting with condensed matter. I will also present new effective field theories and techniques that have been developed to describe these non-relativistic interactions from a spontaneously-broken relativistic point-of-view. Finally, I will present developments from an ongoing experimental effort to utilise a novel type of chemical crystal —single molecule magnets —as a 'magnetic bubble chamber'for detecting light dark matter.

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