Dark matter hiding under our noses — and accelerator experiments to sniff it out

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Dark matter is as mysterious as it is ubiquitous. Cosmological evidence raises more questions than it answers about the origin and nature of the most abundant kind of matter in the Universe. Terrestrial experiments searching for answers have focused mainly on the possibility that the constituent of dark matter is a new particle near the weak scale — at the upper limit of the energy ranges we have explored in the laboratory. But recent years have seen a growing interest in the possibility that dark matter is made of particles in a far more pedestrian mass range, comparable to protons or electrons or somewhere in between. Such light dark matter particles could be hiding under our noses, difficult to detect because their interactions are expected to be weak. I will discuss the theoretical underpinnings of sub-GeV dark matter and prospects for new small-scale experiments to find it. In particular, I will highlight the opportunities for new accelerator-based experiments to fully explore simple and predictive model of light dark matter.