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Quantum simulations with trapped ions[1]

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Trapped ions quantum simulators have shown incredible success in simulating quantum many-body systems, and in certain problems, have exceeded what is possible with classical simulations. Given the prevalence of large-scale simulations of strongly-interacting many-body problems in nuclear and high-energy physics, it is natural to ask if such quantum simulators can provide an advantage over current methods in these fields as well. Since many-body interactions in nuclear and high-energy physics, either described by quantum field theories or nuclear effective theories, are more complex than what can currently be realized in such quantum simulators, it is important to carefully design and commission dedicated simulators with enhanced capabilities to address these problems. In this talk, I will review some of the developments in this area in recent years and will comment on the path forward in the upcoming years.

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