

MAR17-2016-020336

cation, the IARPA LogiQ program, and the IC Postdoctoral Research Fellowship Program.

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Realization of discrete time crystals in a spin chain of trapped ions

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Linear arrays of trapped atomic ions are a unique experimental platform for studying emergent phenomenon in many-body quantum physics. Using laser light to drive collective ion motion, we generate long-range interactions between trapped ion spins and realize models of frustrated quantum magnetism. Local control and individual spin resolution allow us to study such models in ways not possible using condensed matter experiments. I will discuss recent results where our trapped ions were used to study universal properties when these spin models are subjected to Floquet drives. Our system responds with sub-harmonic oscillations which are stabilized by the many-body interactions, which are clear signatures of a state known as a discrete time crystal.