1116-81-2787 **Arindam Mallick** (marindam@imsc.res.in), CIT Campus, Taramani, Chennai, Tamil Nadu 600113, India, and **C. M. Chandrashekar*** (chandru@imsc.res.in), CIT Campus, Taramani, Chennai, Tamil Nadu 600113, India. *Dirac quantum cellular automaton from split-step quantum walk.* Preliminary report.

Simulations of one quantum system by an other system has an implications in realization of quantum machine that can imitate any quantum systems and solve problems that are not accessible to classical computers. To engineer quantum simulations, the description of quantum system dynamics have been discretized in space and time to represent quantum cellular automata (QCA), a local unitary update rule on a lattice. The operators defining the QCA are not always in an operational form on an other quantum system. In this talk, starting from a split-step discrete-time quantum walk (DTQW) we present the recovery the Dirac quantum cellular automaton (DQCA). This split-step DTQW implementable in different quantum system can efficiently simulate the Dirac equation (DE) and bridge the connection between DE-DQCA-DTQW. We show that all the fine oscillations and higher entanglement observed in DQCA but not in conventional DTQW are completely recovered using split-step DTQW. We will also present the Zitterbewegung oscillations and Klein paradox from the parameters that define split-step DTQW. (Received September 22, 2015)