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Phase transitions in the BMN matrix model (Yuhma Asano, Dublin Institute for Advanced)

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An idea to formulate string theory or M-theory by a gauge theory attracts theorists and has been extensively studied. The gauge theory should be lower dimensional so that a geometry in string or M-theory, which has higher dimensions, must emerge from it. This suggests that there should be a phase transition in the gauge theory and that the geometry would appear as its temperature decreases. In this talk, we focus on the BMN matrix model, which is considered as a non-perturbative formulation of M-theory on the pp-wave geometry and also conjectured to have a gauge/gravity duality, which relates each vacuum on the gauge theory side to a bubbling geometry in the type IIA supergravity. Our preliminary results of Monte Carlo simulations show two phase transitions and one of them looks related with emergent geometry.

Summary