Title: The Elegant Joint Measurement is nonlocal in the triangle network

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ETH zürich

The Elegant Joint Measurement is nonlocal in the triangle network

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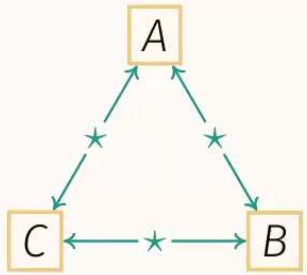
Triangle network:



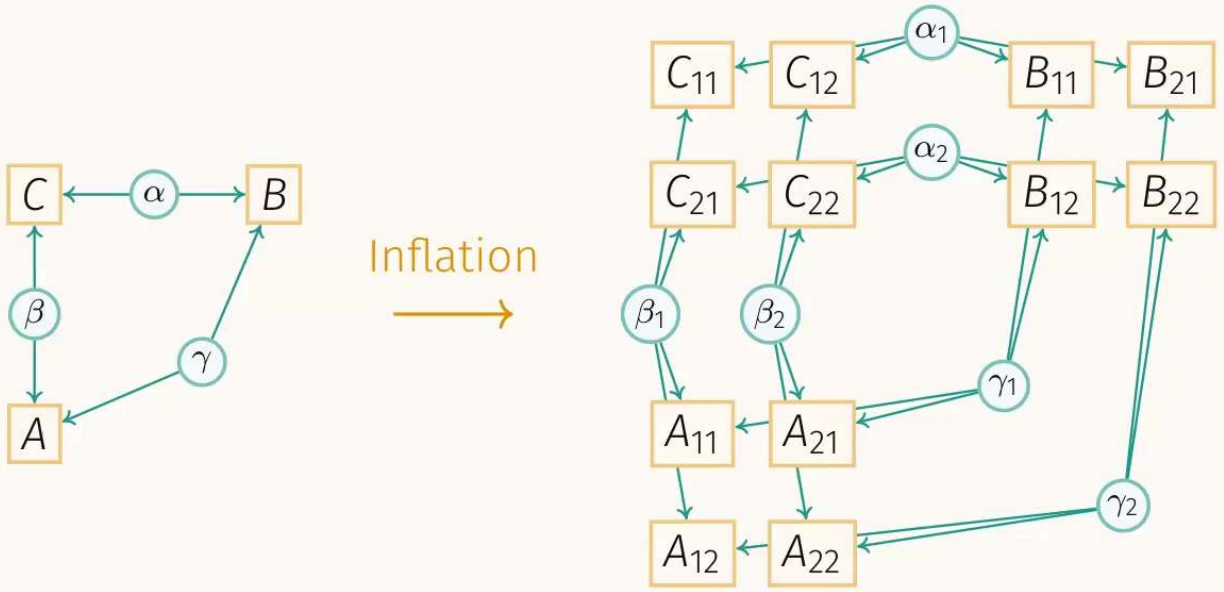
$p(a, b, c)$

Local if $p(a,b,c) = \int_{[0,1]^{\times 3}} \mathrm{d}\alpha\, \mathrm{d}\beta\, \mathrm{d}\gamma\, p_A(a|\beta\gamma) p_B(b|\gamma\alpha) p_C(c|\alpha\beta)$

Quantum if $p(a,b,c) = \mathrm{Tr}\left[E^a_{\beta_L\gamma_R} F^b_{\gamma_L\alpha_R} G^c_{\alpha_L\beta_R} \rho_{\alpha_L\alpha_R} \sigma_{\beta_L\beta_R} \tau_{\gamma_L\gamma_R}\right]$

Elegant joint measurement (EJM): quantum $p(a, b, c)$

- simple and highly-symmetric
- conjectured to be nonlocal in 2017, lots of evidence



If $p(abc)$ is local, then there exists $q(a_{11} \ldots c_{22})$ satisfying linear constraints.

Problem: need to consider large graphs, which is computationally difficult

This work: big leaps in mathematical & algorithmic treatment of inflation $\longrightarrow$ better nonlocality detection