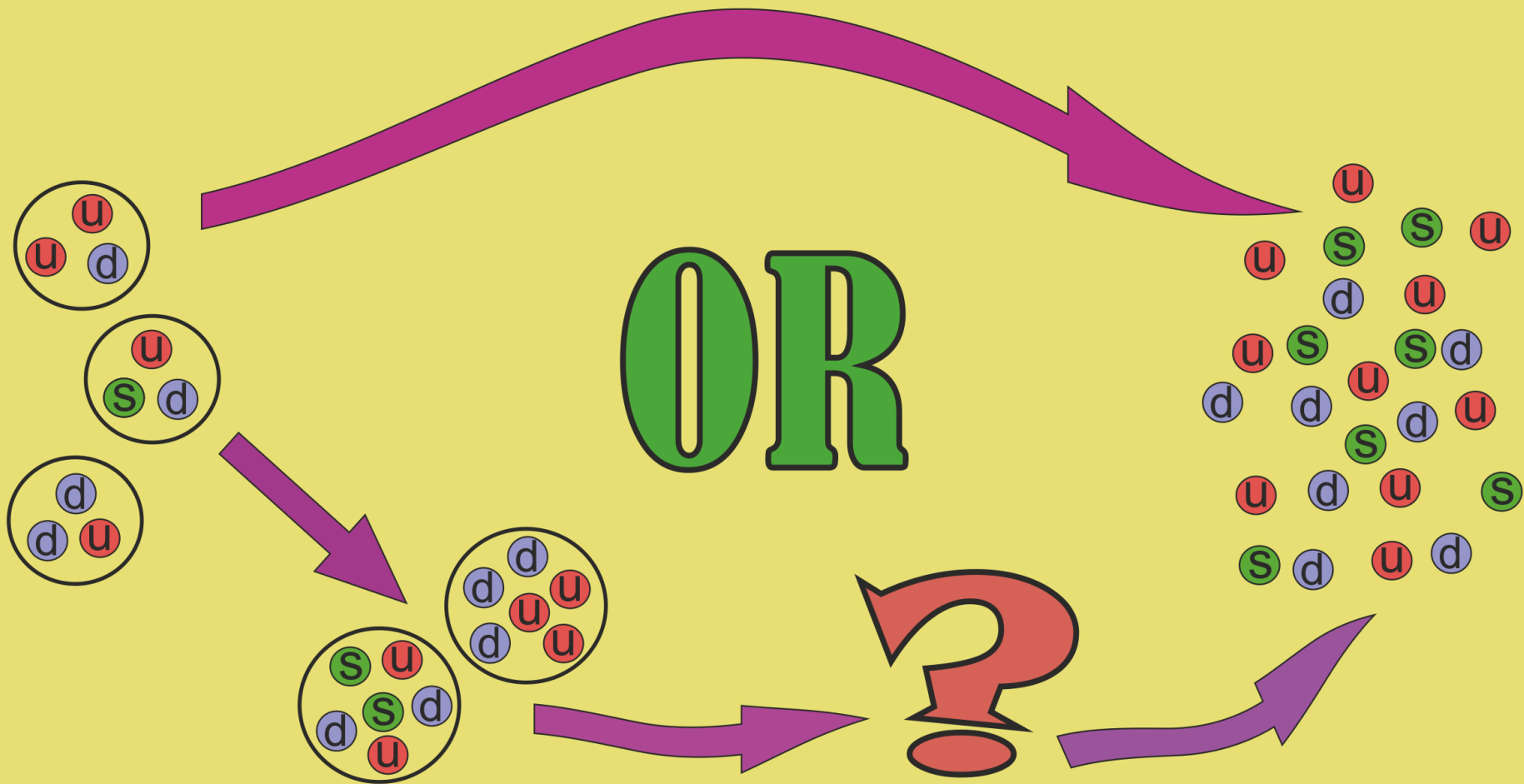


Multiple Phase Transitions Inside Hybrid Stars

A. Yudin, T. Razinkova, D. Nadyozhin

Phase transition from nuclear matter to quark matter: is it a single strong event, or a series of weaker transitions?

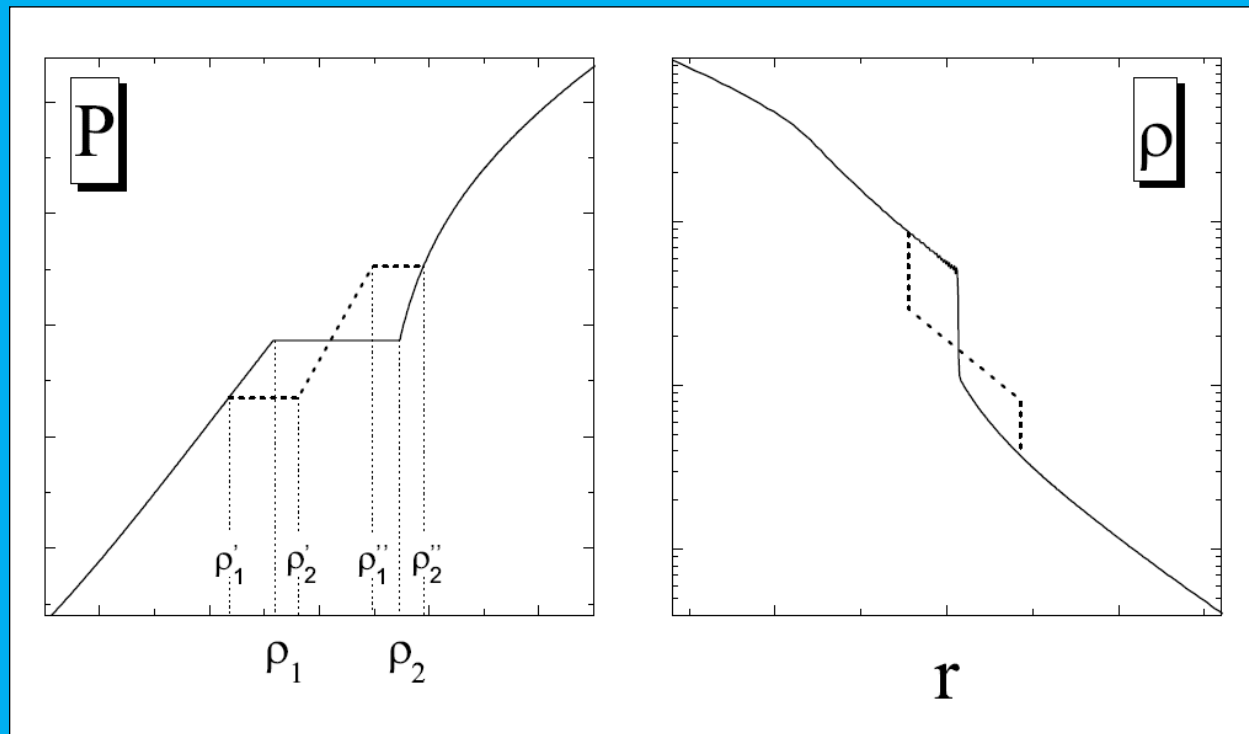


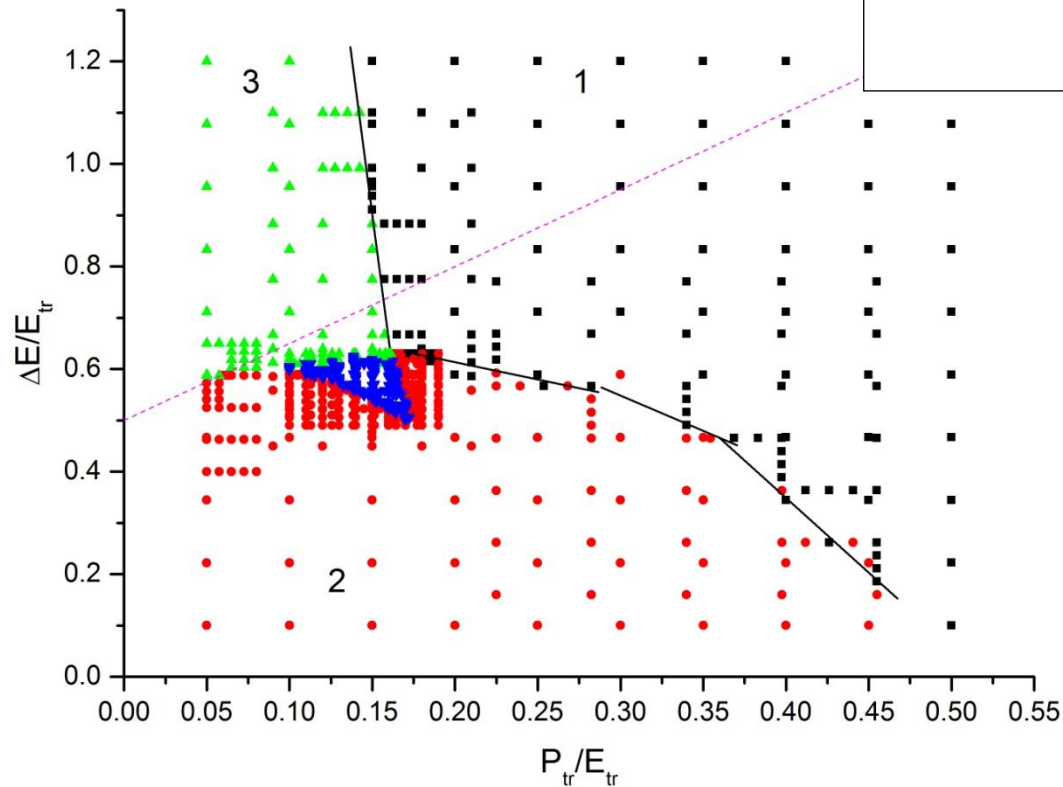
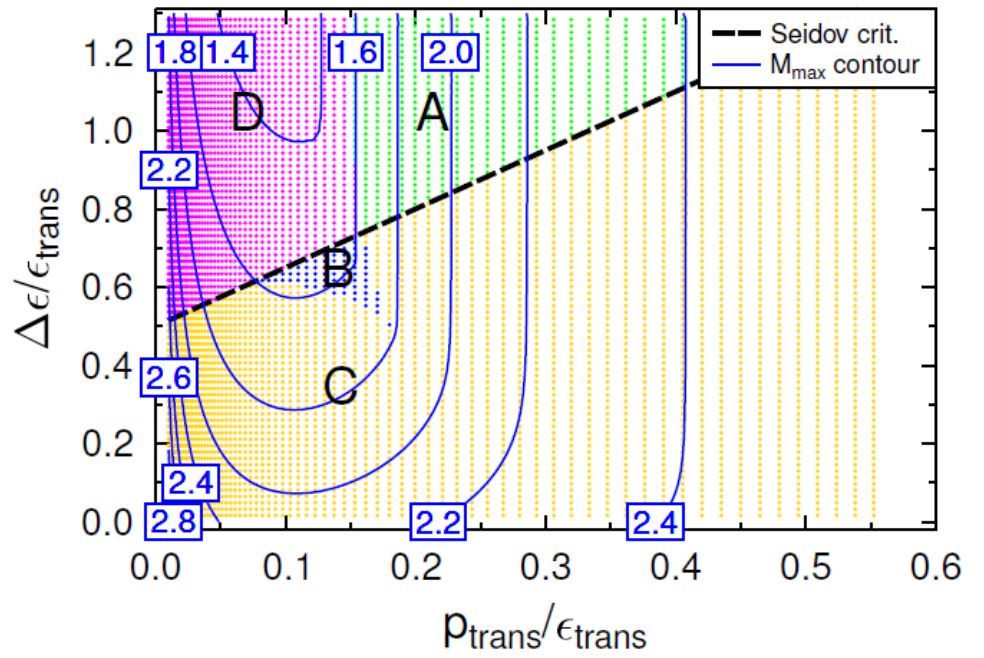
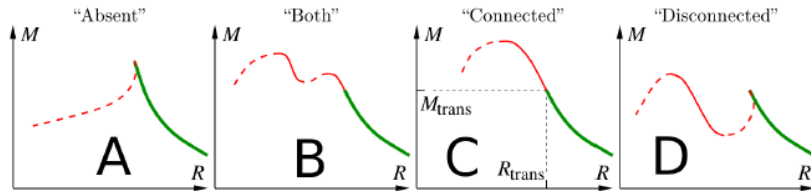
Variational Principle

$$\mathbf{V} = \mathbf{V}_I + \mathbf{V}_O = \int_0^M \left[P\gamma\rho \left(\frac{d\varphi}{dm} \right)^2 - \frac{4\beta}{9} \frac{m\varphi^2}{v^{7/3}} \right] dm + \frac{\beta m_*}{3v_*^{4/3}} \frac{(\varphi_1 - \varphi_2)^2}{\frac{1}{\rho_1} - \frac{1}{\rho_2}} > 0,$$

$$\mathbf{V}'_O \propto \frac{(\varphi_1 - \varphi_3)^2}{\frac{1}{\rho_1} - \frac{1}{\rho'_2}} + \frac{(\varphi_3 - \varphi_2)^2}{\frac{1}{\rho'_1} - \frac{1}{\rho_2}} \geq \frac{(\varphi_1 - \varphi_2)^2}{\frac{1}{\rho_1} - \frac{1}{\rho_2}}$$

$$\frac{\rho_2}{\rho_1} < \frac{3}{2}.$$





M. G. Alford, S. Han, and M. Prakash, Phys. Rev. D **88**, 083013 (2013).

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