

LIGHT AXIONS SHRINK WHITE DWARFS

PhD, TU Munich



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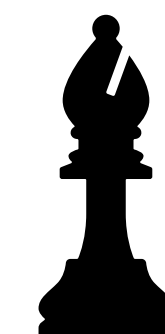
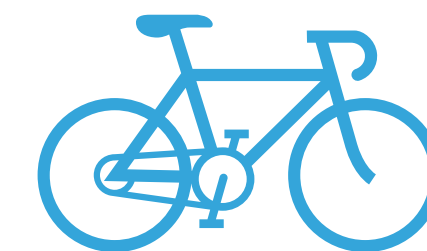


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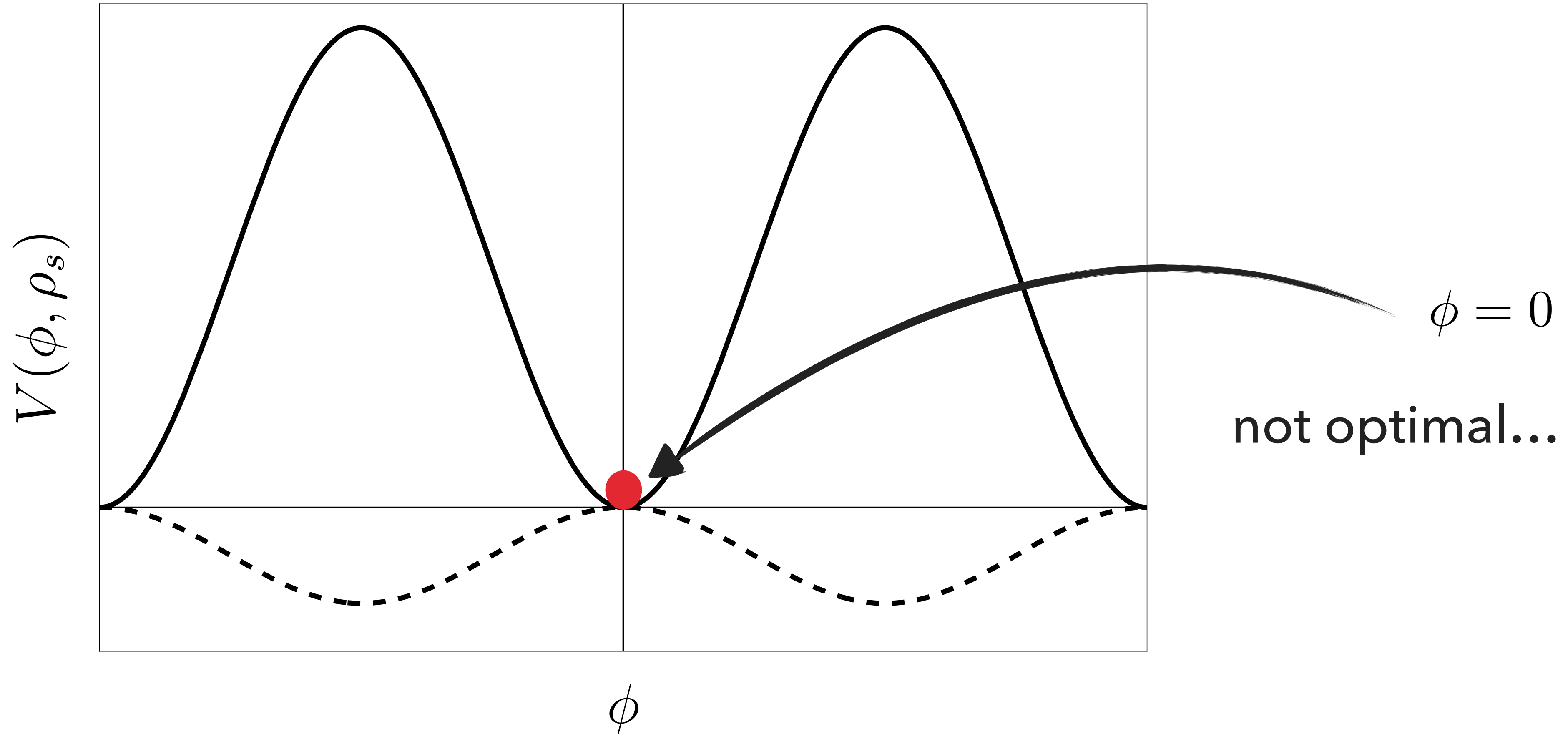


Also: The usual stuff



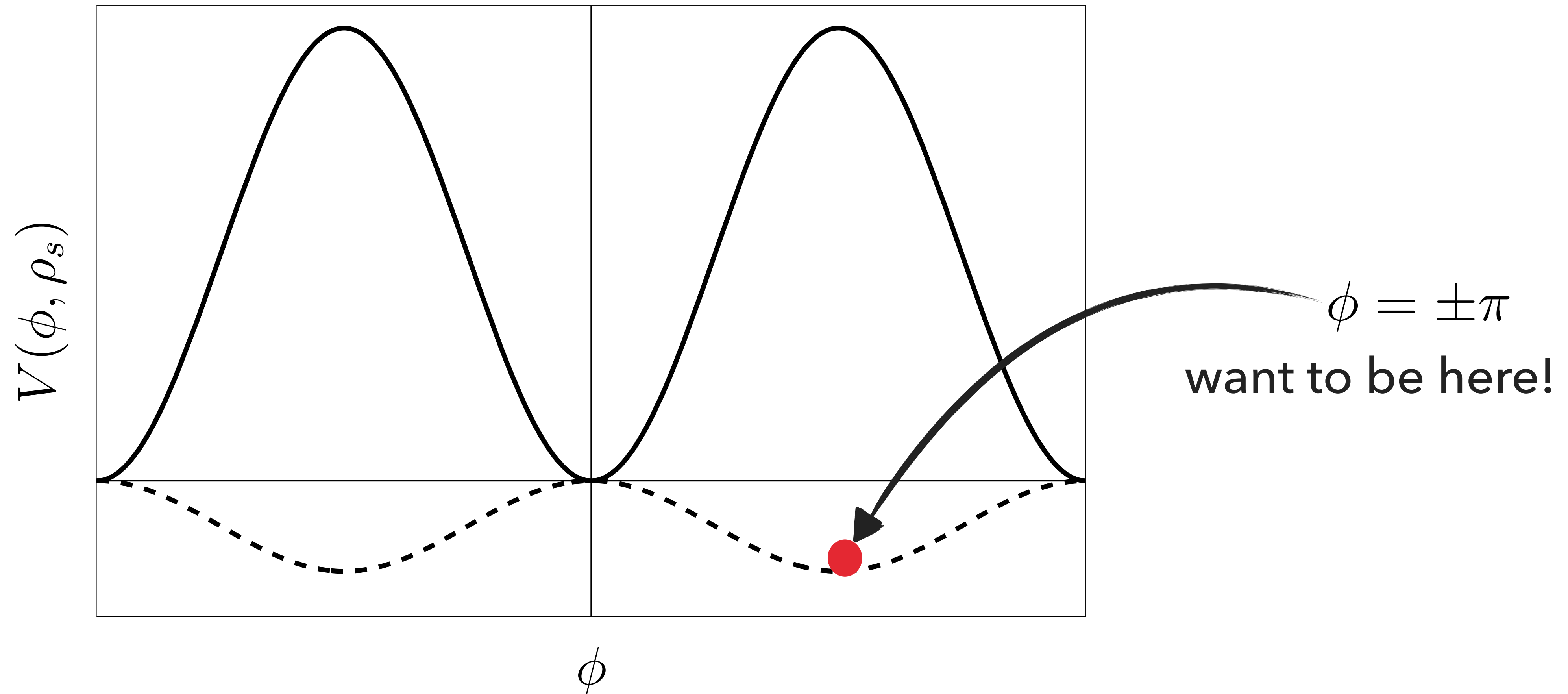
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$$V(\phi) \sim (\epsilon \Lambda_{\text{QCD}}^4 - gm_N n) \cos\left(\frac{\phi}{f}\right)$$



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Coupling to nucleon changes the mass at $n_c \sim \frac{\epsilon \Lambda_{\text{QCD}}^4}{gm_N} \quad \phi = \pm\pi$

$$m_N^* = \begin{cases} m_N & \phi = 0 \\ m_N(1 - g) & \phi = \pi \end{cases}$$

Drastically changes the EOS of Stars

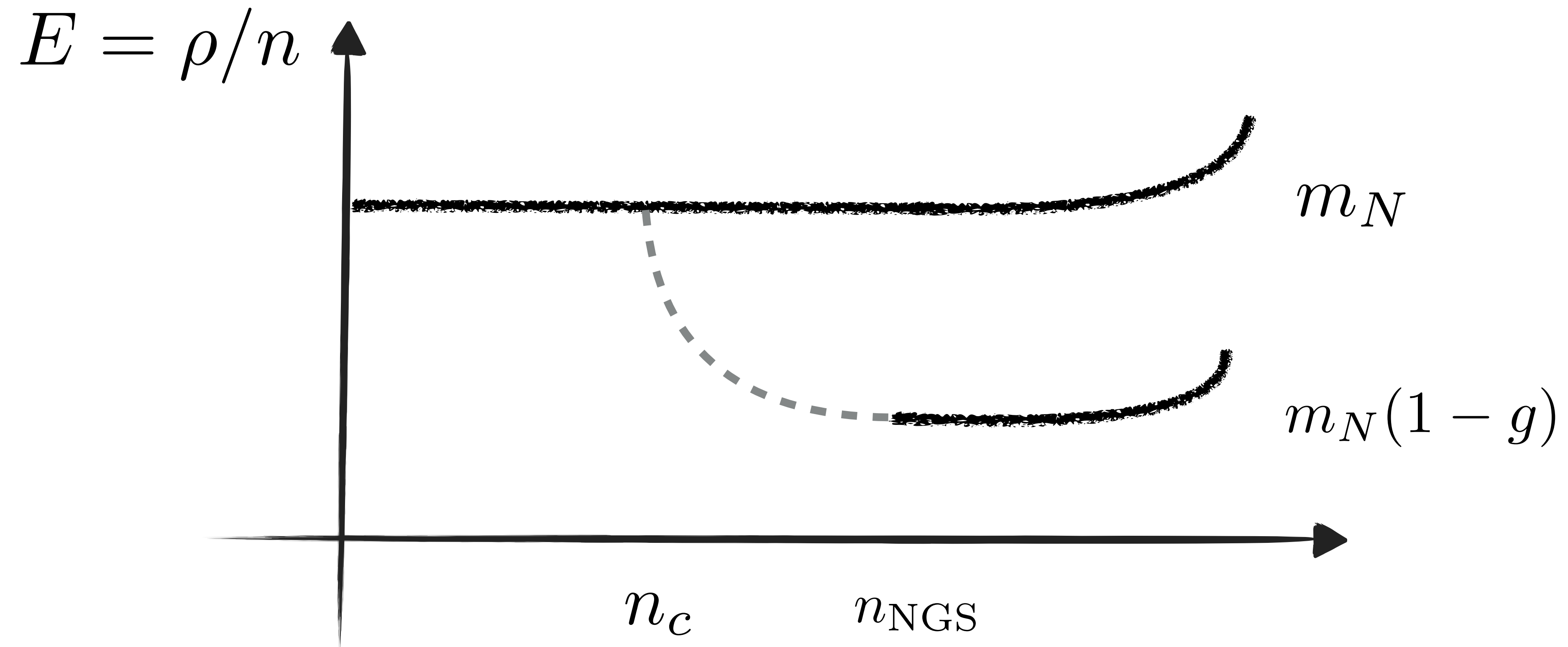
Why?

There is a new ground state of matter!

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Why? There is a new ground state of matter

Take non-relativistic neutrons and squeeze them together

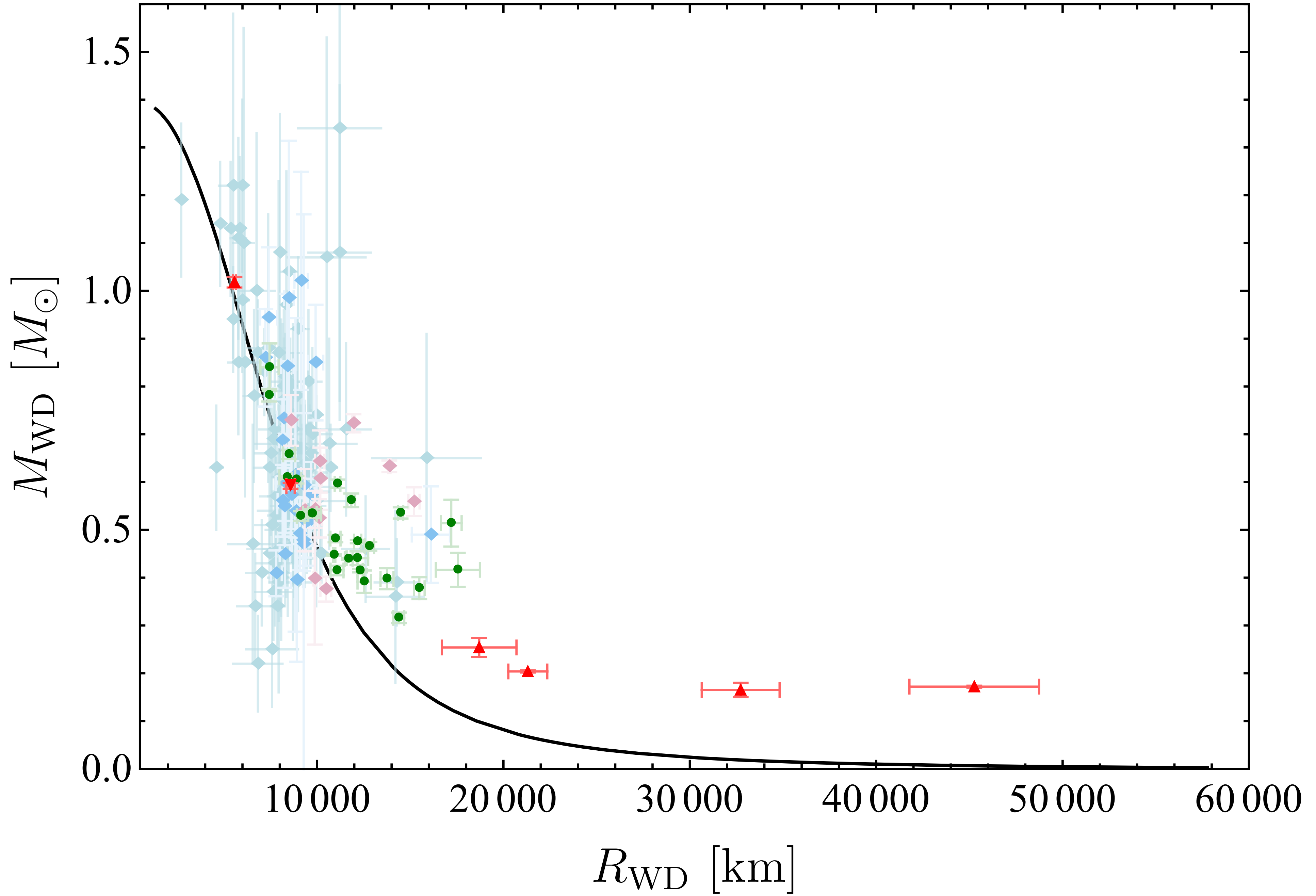


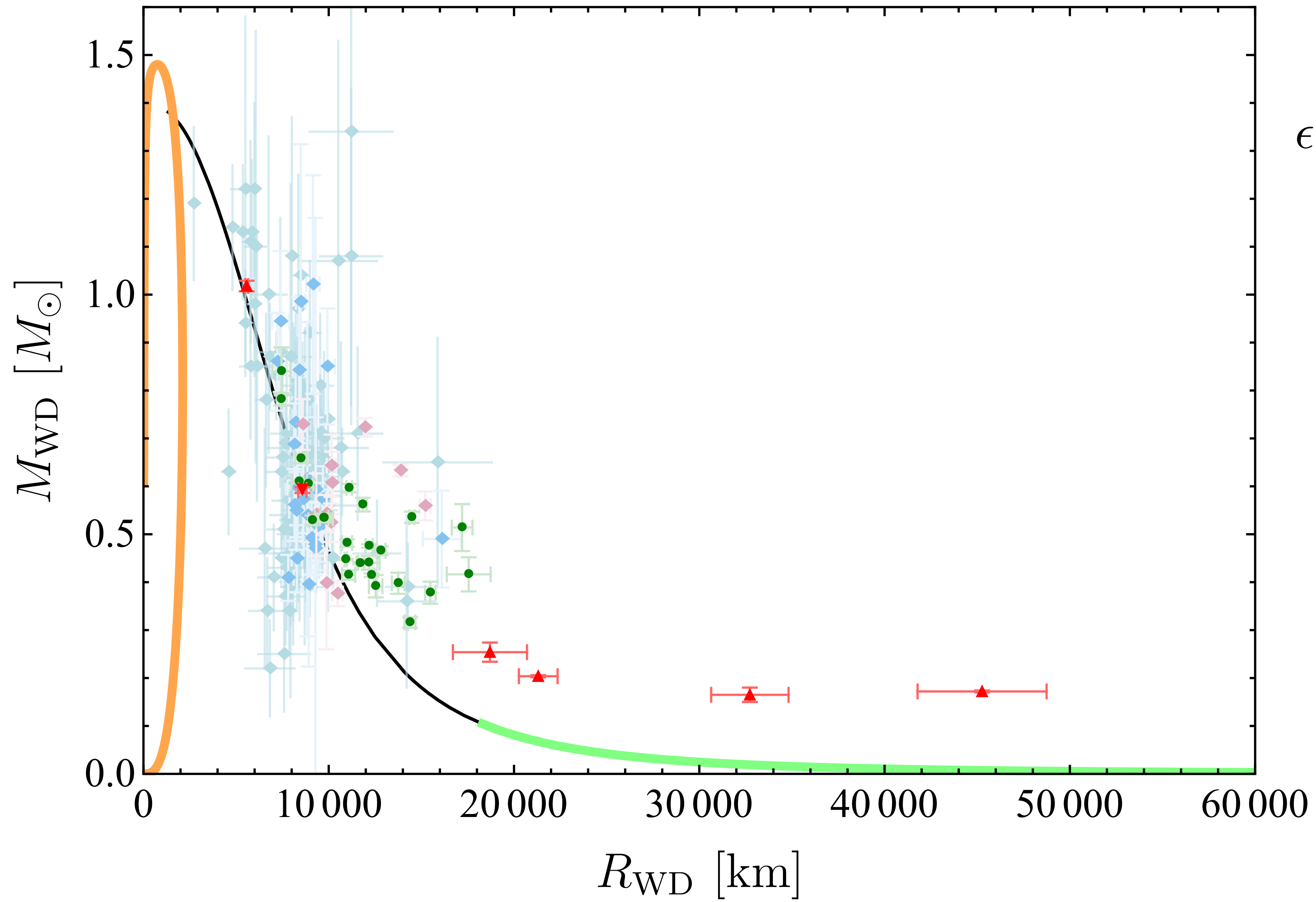
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White Dwarfs work analogously

Balance gravity with electron degeneracy pressure

Mass to good approximations from gas of non-interacting nuclei ${}^4\text{He}, \dots, {}^{24}\text{Mg}$





AXION PARAMETER SPACE

