"Bose Star Collisions"- An Overview from Formation to Disruption

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Motivation

- Macroscopic bound clumps of bosons (**Axions**, ALPs)
  - E.g. solitonic cores in FDM
- Have been shown to form by gravitational interactions in [1]:

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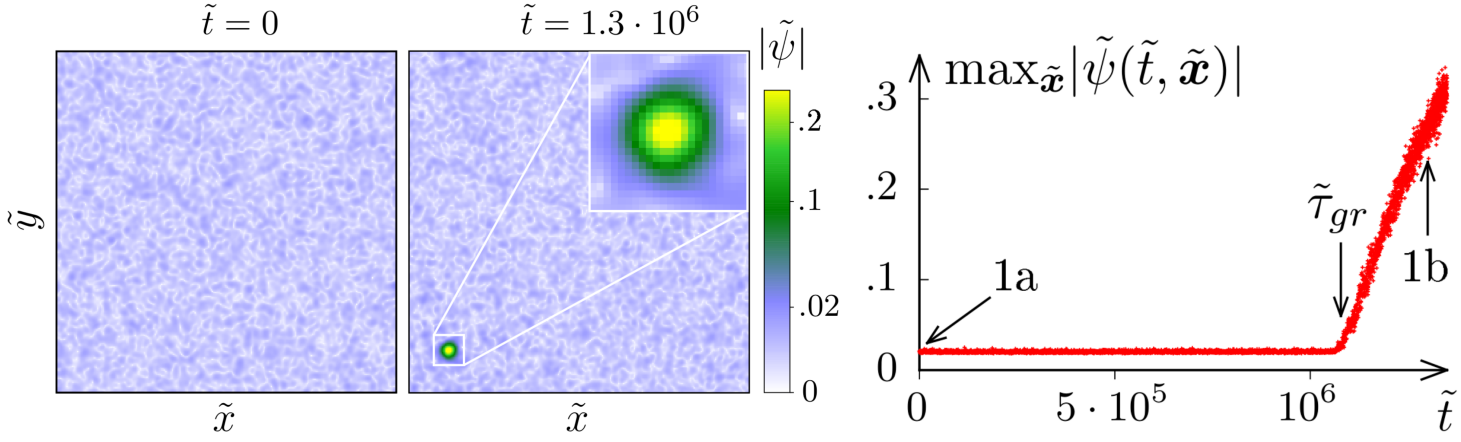

- Necessary initial coniditions are fulfilled in typical *Axion Miniclusters* [1],[2]
- High-density DM objects $\Rightarrow$ Probe for DM Detection?

GPP Equations

- Possibly detectable through
  - Gravitational Lensing (low masses $M_\star \lesssim 10^{-12}\, M_\odot$, e.g. $M_\oplus \simeq 3 \cdot 10^{-6}\, M_\odot$)
  - GW signals (similar)
  - Parametric resonance into photons by $g_{a\gamma\gamma}$ $\Rightarrow$ **BS-NS Collisions**
  - Relativistic Axion emission **(Mass Growth, Mergers, Collisions)**

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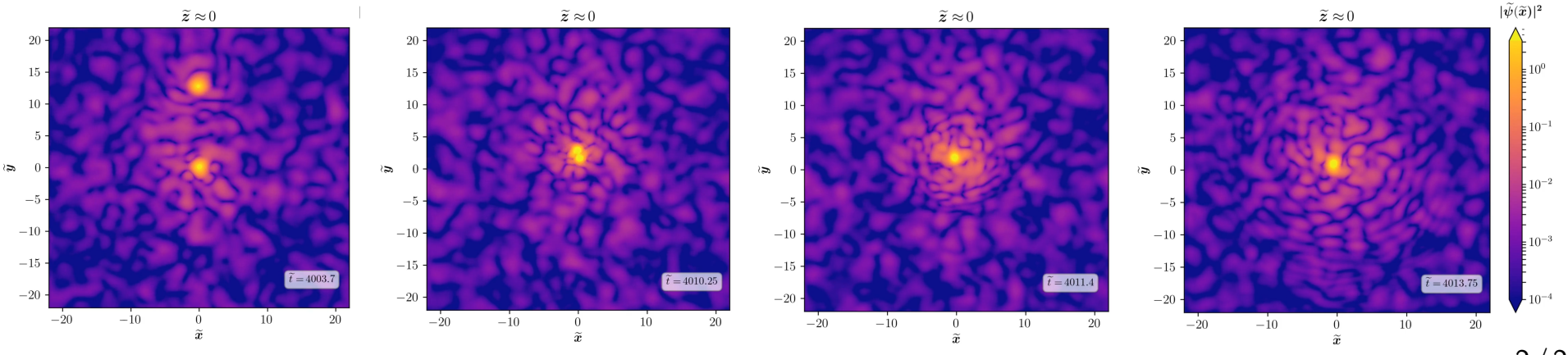

Thank you for your attention!

References:

[1]: Levkov et al. (2018): *Gravitational Bose-Einstein condensation in the kinetic regime*

[2]: Tkachev, Kolb (1993): *Femtolensing and Picolensing by Axion Miniclusters*