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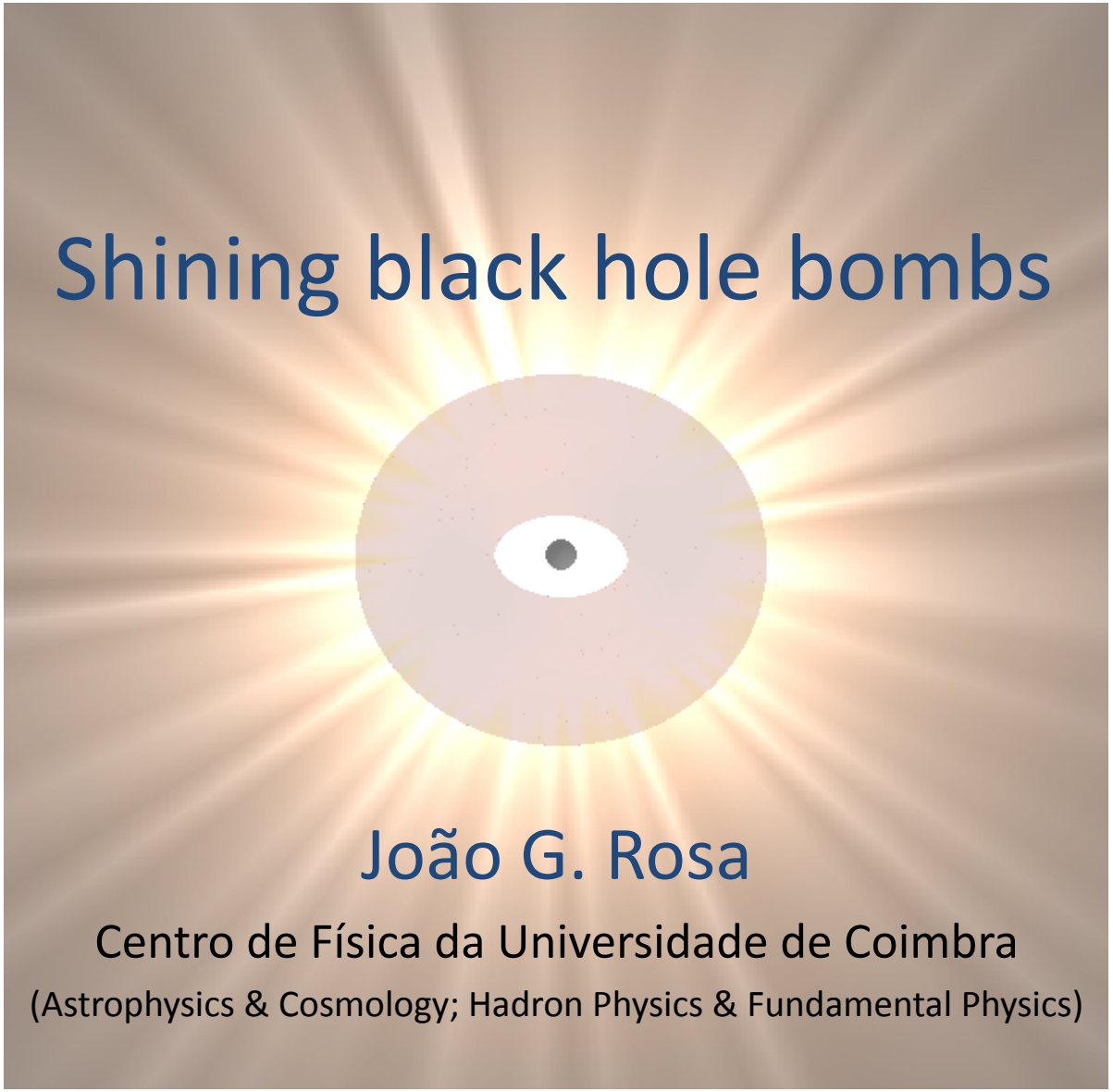
Shining black hole bombs



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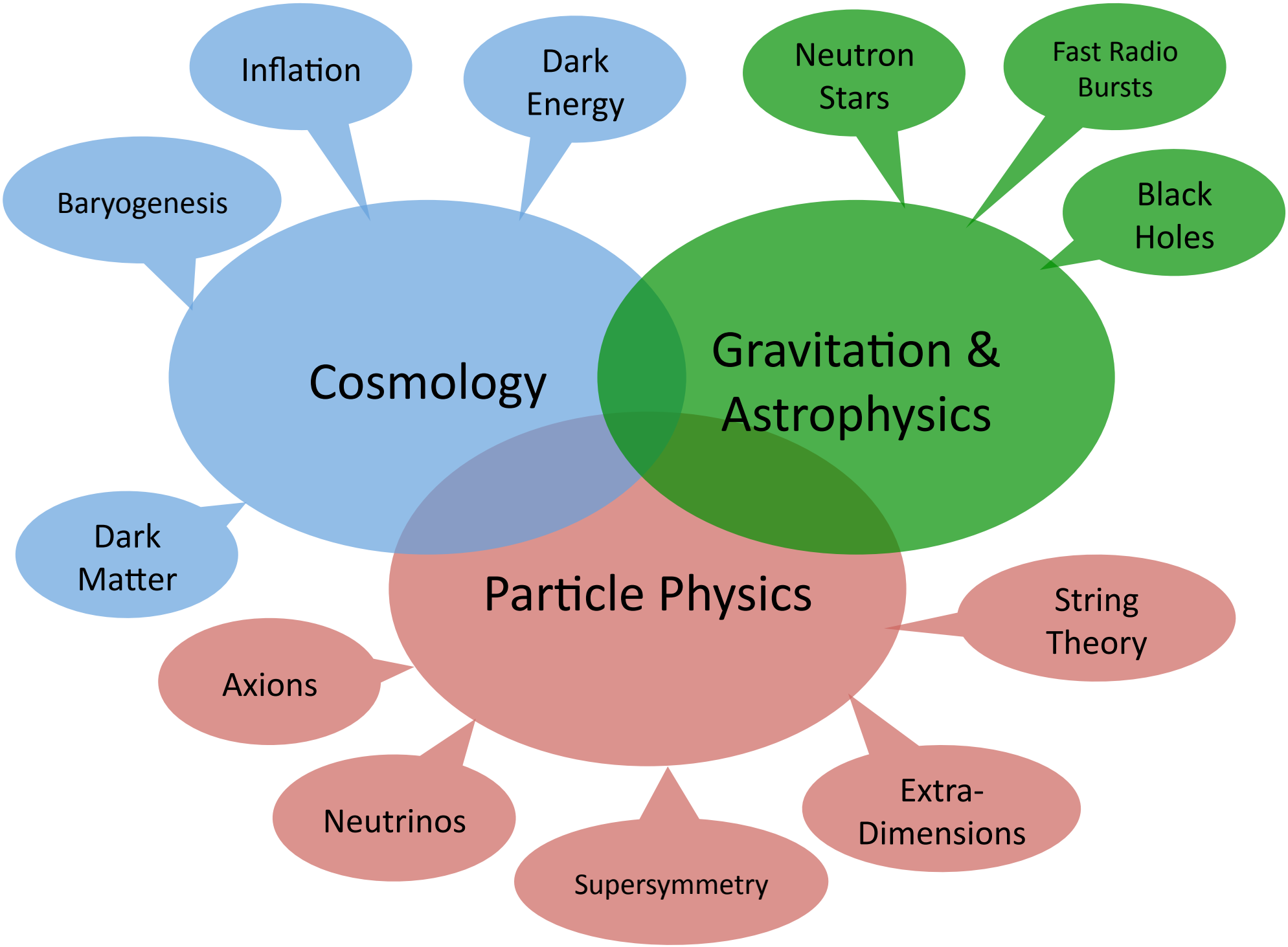
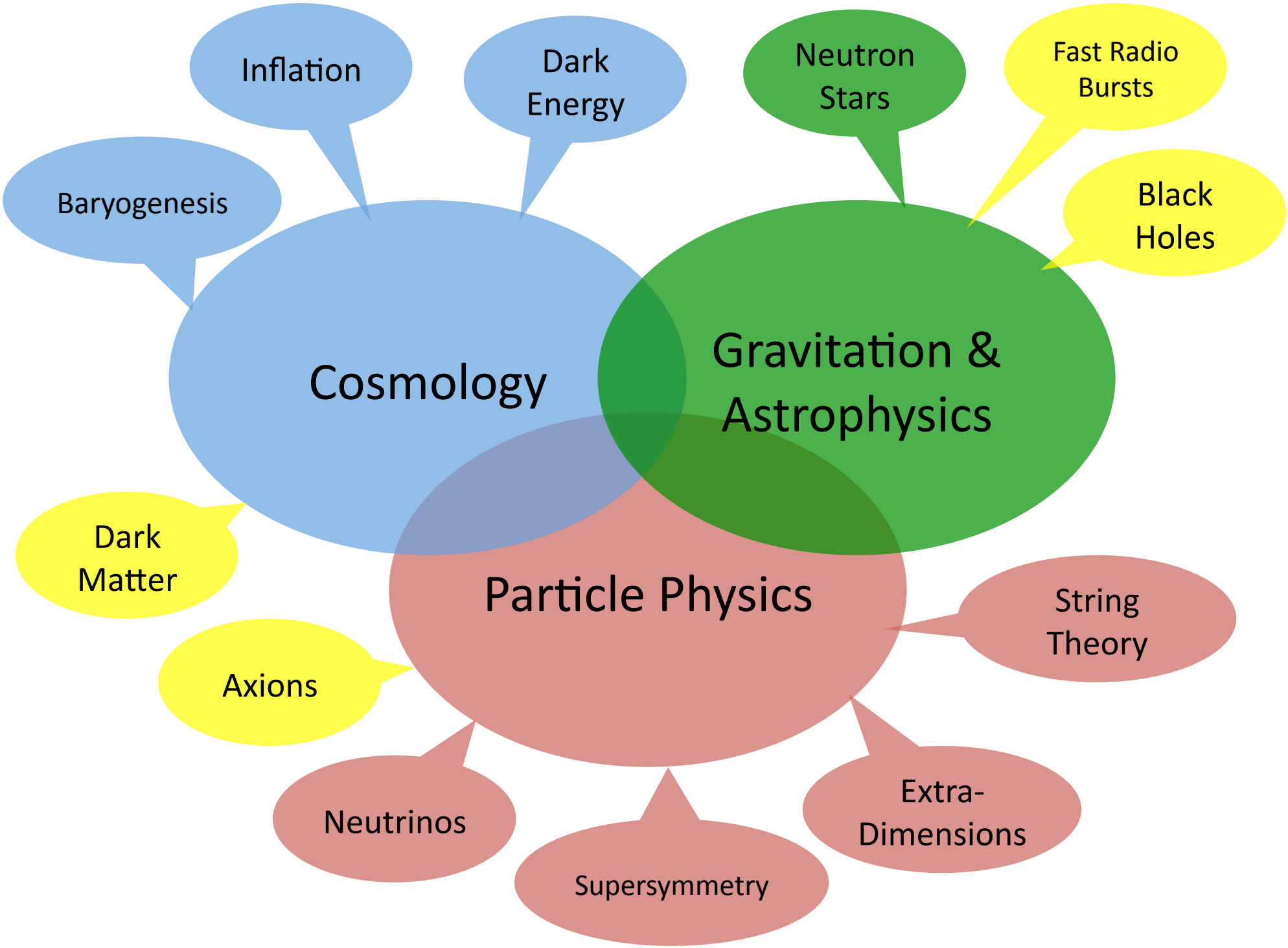

Inflation
Dark Energy
Baryogenesis
Cosmology
Dark Matter
Neutron Stars
Fast Radio Bursts
Black Holes
Gravitation & Astrophysics
Particle Physics
String Theory
Axions
Neutrinos
Supersymmetry
Extra-Dimensions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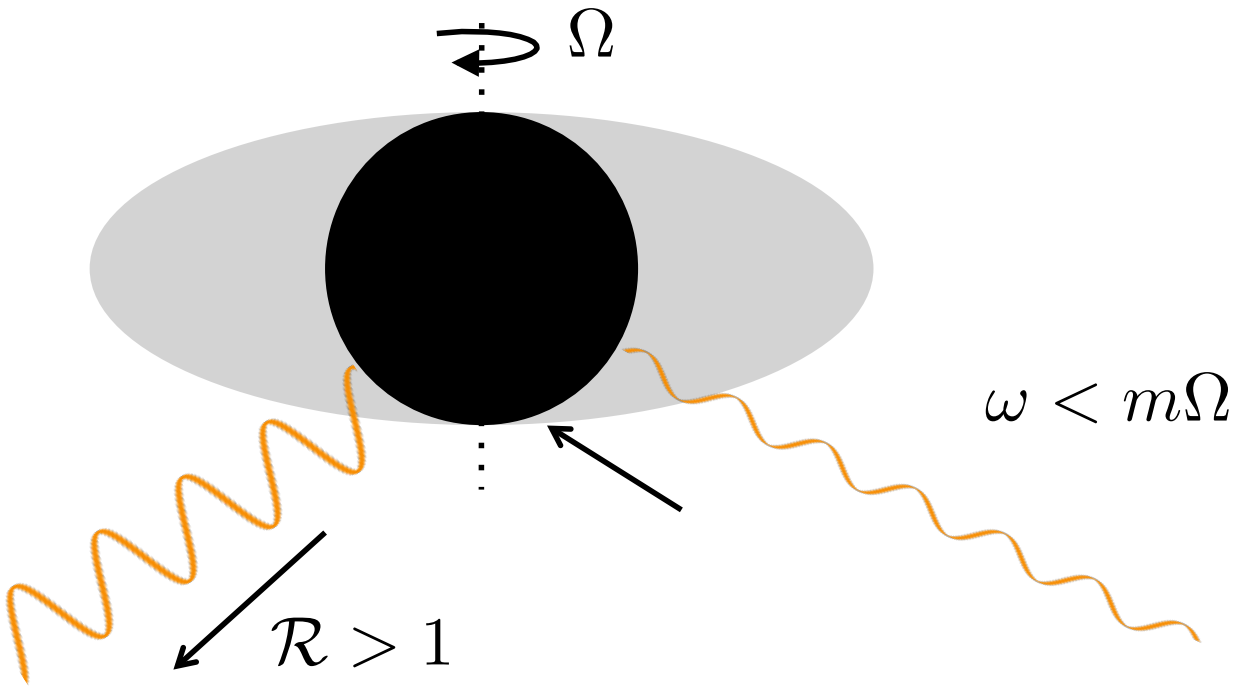
Black hole superradiance

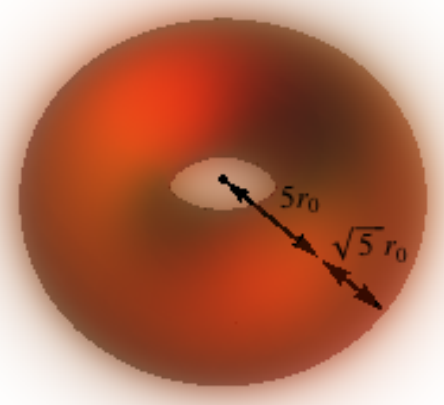
Low frequency waves are amplified by scattering off a spinning black hole:



Black hole superradiant instabilities

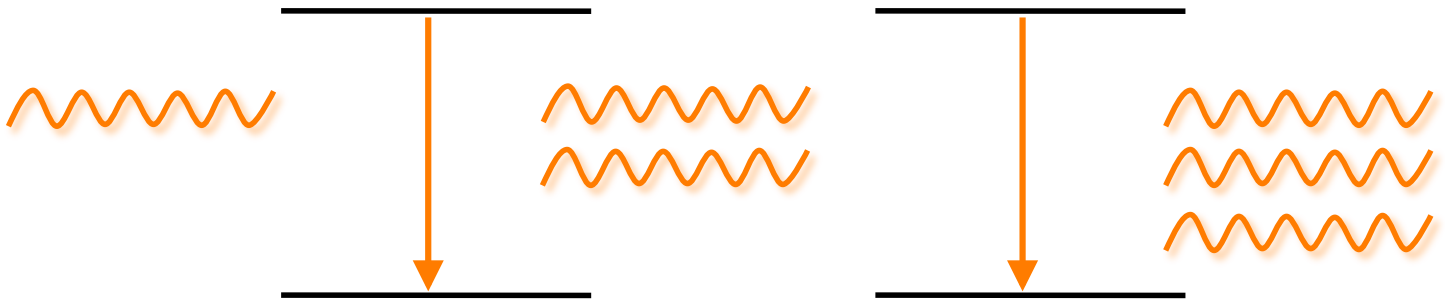
Massive particles are confined in gravitational bound states around the BH

Superradiance makes occupation numbers grow exponentially fast

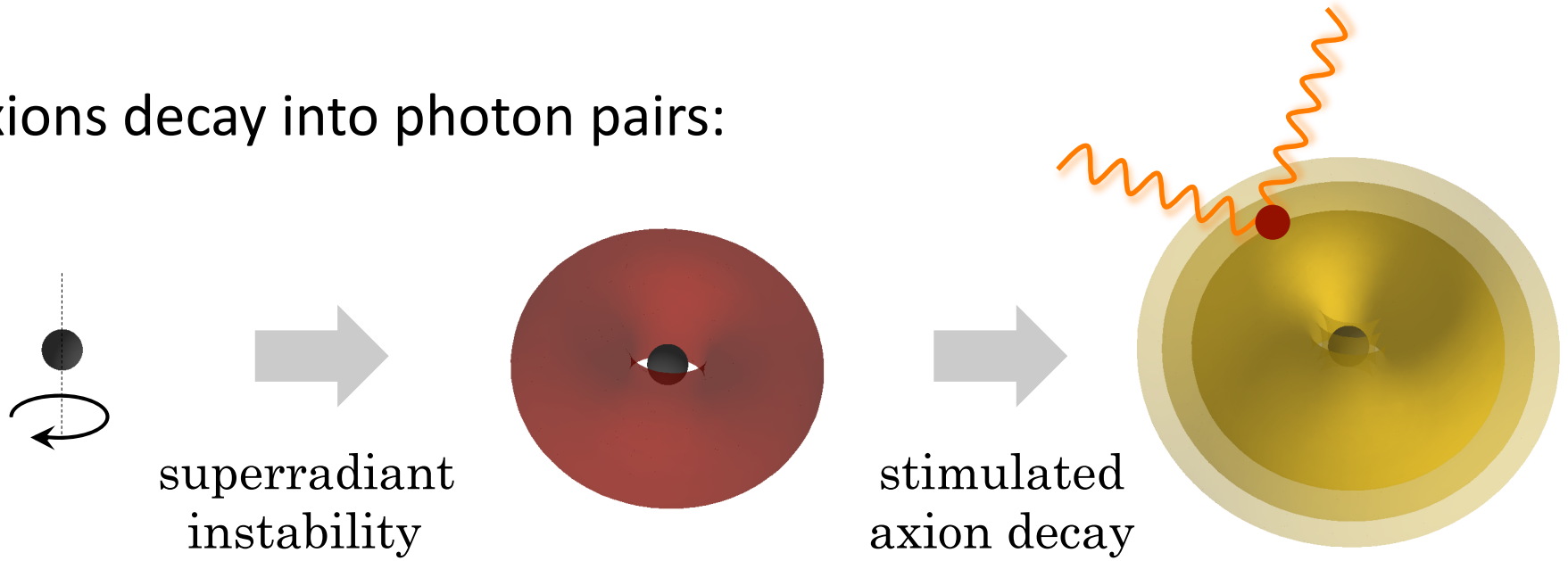


Effect requires low mass bosonic particles, like the QCD axion!

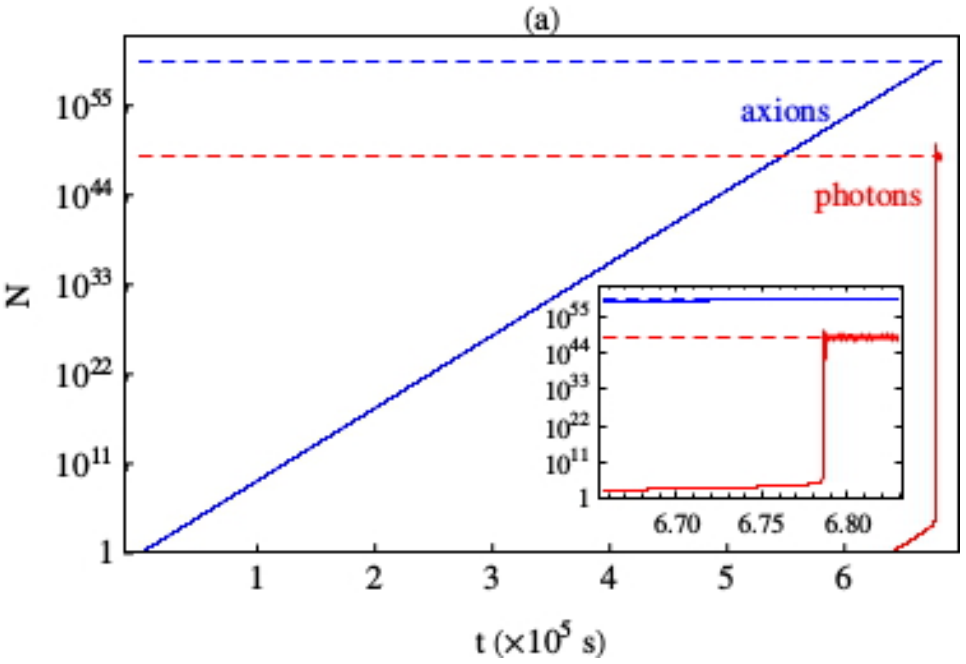
Axion-black hole lasers

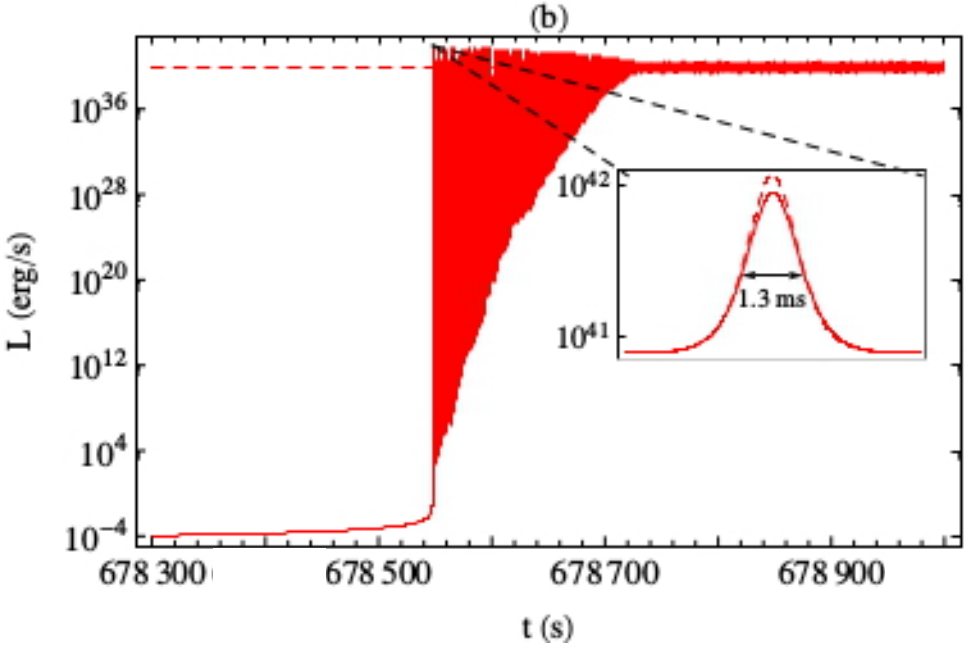


Axions decay into photon pairs:

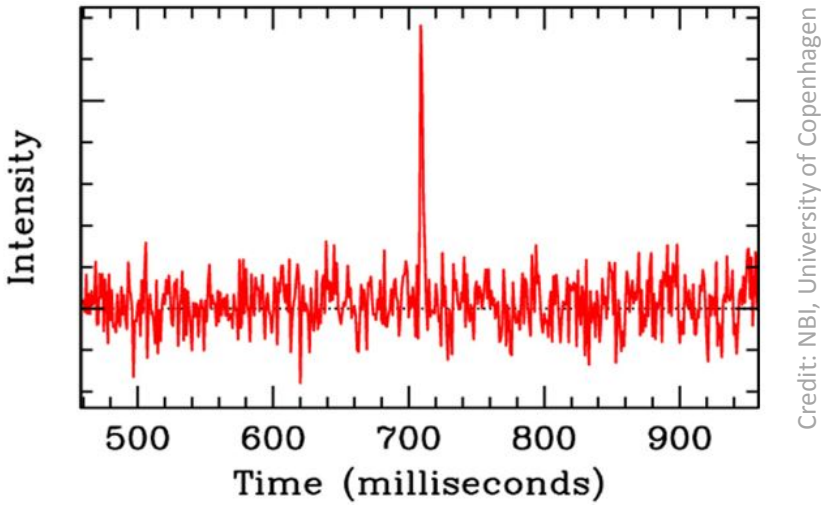


Fast Radio Bursts



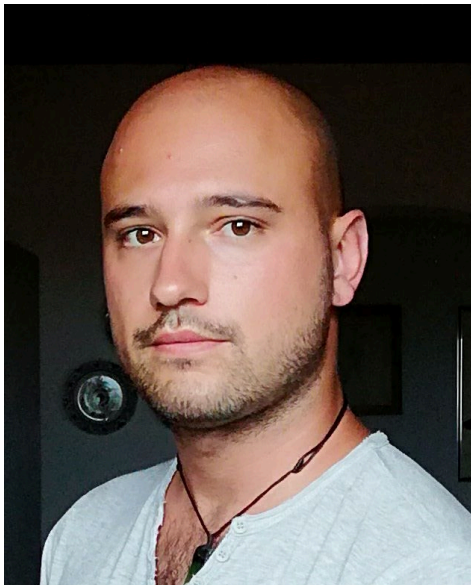


$$
\begin{aligned}
M_{BH} &= 8 \times 10^{23}\ \mathrm{kg} \\
m_{\mathrm{axion}} &= 10^{-5}\ \mathrm{eV}/c^2 \\
f &\simeq 1\ \mathrm{GHz}
\end{aligned}
$$



Credit: NBI, University of Copenhagen

Please check the poster for more information and talk to my PhD students:



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