



Contribution ID: 22

Type: **not specified**

Axion clouds may survive the perturbative tidal interaction over the early inspiral phase of black hole binaries

Tuesday, 28 September 2021 11:30 (15 minutes)

Axion forms a cloud around a rotating black hole (BH) by superradiant instability. On the other hand, considering the cloud associated with a BH in a binary system, tidal interaction depletes the cloud in some cases during the inspiral phase. To clarify the condition that clouds avoid disappearing, we made the exhaustive study of cloud depletion numerically in a wide parameter range for equal mass binaries.

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Session Classification: Tuesday AM