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Effect of Precession on Gap Clearing: An Application to Spinning Super-Massive Black Hole Binaries SIDDHARTH MAHESH, SEAN MCWILLIAMS, MICHAL PIROG, West Virginia University — The study of gas disks surrounding a supermassive black-hole binary (SMBHB) and their evolution during both the inspiral and merger stages can inform electromagnetic searches for candidate SMBHBs, in addition to being relevant for the expected gravitational-wave signal. A toy model for such a system involves an initial clearing of a central cavity in which the binary evolves independently from the disk dynamics. It is therefore possible in the early phases of such decoupled evolution that spin-orbit induced precession can allow for periodic misalignment in the planes of the binary and circumbinary disks. This study aims to quantify the response of the cavity cleared through the mechanism of Lindblad resonances to such a misalignment. Analytical calculations of truncation radii for misaligned disks are combined with Order-of-Magnitude timescale arguments to indicate the inner radius of the disk evolves secularly on the spin-orbit precession timescale. Numerical follow up will clarify the effect of the secular evolution on the soft X-ray spectrum, which is believed to be dominated by resonant gap clearing.

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