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Binary Black Holes from Dense Star Clusters

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The recent detections of gravitational waves from merging binary black holes have the potential to revolutionize our understanding of compact object astrophysics. But to fully utilize this new window into the universe, we must compare these observations to detailed models of binary black hole formation throughout cosmic time. In this talk, I will review our current understanding of cluster dynamics, describing how binary black holes can be formed through gravitational interactions in dense stellar environments, such as globular clusters and galactic nuclei. I will review the properties and merger rates of binary black holes from the dynamical formation channel. Finally, I will describe how the spins of a binary black hole are determined by its formation history, and how we can use this to discriminate between dynamically-formed binaries and those formed from isolated evolution in galactic fields.