The sound of silence — Recovering signals from time-frequency zeros

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Disentangling multicomponent nonstationary signals into coherent AM-FM modes is usually achieved by identifying loud time-frequency trajectories where energy is locally maximum. We will here present an alternative perspective that relies on silent points, namely spectrogram zeros. Based on the theory of Gaussian analytic functions, a number of results will be presented regarding the distribution of such zeros considered as a point process in the plane, with repulsive properties. The rationale and the implementation of the zeros-based approach for recovering signals embedded in noise will then be discussed, with an application to the extraction and characterization of actual gravitational wave chirps.