ID de Contribution: **62** Type: **MÉTHODES D'ANALYSE DES DONNÉES**

# It takes two (spins) to tango: Interpreting gravitational-wave data with a generalized effective precession parameter

*mardi 30 mars 2021 14:30 (15 minutes)*

Current gravitational-wave data analysis of merging binary black holes accounts for two precessing spins, allowing inference of the six spin degrees of freedom. Nonetheless, it is convenient to use effective parameters to interpret detections; the effective aligned spin $\chi_{\rm eff}$ and the effective precessing spin $\chi_{\rm p}$ measure components parallel and perpendicular to the orbital angular momentum, with measurements away from zero indicating large spins and significant precession, respectively. While the aligned spin is conserved during an inspiral, the precessing spin is not; furthermore, its definition employs a single-spin approximation that retains some, but not all, precession-timescale variations. To rectify this inconsistency, we propose two-spin definitions that either fully consider or fully average those variations. The generalized parameter presents an exclusive region, $1 \leq \chi_{\rm p} \leq 2$, accessible only to binaries with two precessing spins. For current LIGO/Virgo events, our generalized parameter indicates that, while (i) previous measurement errors on the effective precessing spin may be underestimated, (ii) the evidence for spin precession may be stronger than suggested previously.

**Auteurs principaux:** GEROSA, Davide; MOULD, Matthew; GANGARDT, Daria; SCHMIDT, Patricia; PRATTEN, Geraint; THOMAS, Lucy

**Orateur:** MOULD, Matthew

**Classification de Session:** Contributed talks: Data analysis methods