What is quantum about quantum trajectory equations? JAY GAMBETTA, Institute of Quantum Computing, HOWARD WISEMAN, STEVE JONES, ERIC CAVALCANTI, Griffith University — Quantum trajectory equations are stochastic equations for the state of an open quantum system conditioned on a monitoring i.e. a continuous-in-time measurement of a bath to which it is coupled. They are closely related to classical stochastic equations for classical probability distributions called filtering equations (e.g. the Kalman filter). Given this close relation, the question arises: what is quantum about quantum trajectory equations? In this talk I suggest that the answer lies in the ability of an experimenter to choose different monitoring schemes. Moreover, I propose that there is an experimental way to distinguish between cases where this choice does demonstrate the quantum nature of the noise, and those where it does not.