Heavy quark master equations in the Lindblad form YUKINAO
AKAMATSU, KMI, Nagoya University — Understanding the quantum dynamics
of quarkonia is essential in the description of bottomonia and charmonia in the
quark-gluon plasma. So far, it has been quite naively assumed that their dynamics
can be described by the Schrödinger equation with in-medium, screened potential.
Such a naïve approach is incomplete, especially when one studies the time-evolution
of quarkonia. After the discovery of imaginary part in the real-time in-medium
potential, it is recognized that quarkoia should be viewed as open quantum systems
in the environment of quark-gluon plasma. In the open quantum system, master
equation, instead of the Schrödinger equation, describes the quantum dynamics of
quarkonia. Open quantum system techniques, such as influence functional approach,
have been applied to quarkonia. In this presentation, I will summarize developments
in this approach and show how to obtain the Lindblad-form master equation, which
preserves the complete positivity of the density matrix of the system.

Yukinao Akamatsu
KMI, Nagoya University