Parametric instability of a Fabry-Perot cavity of Einstein Telescope

Kazuhiro Yamamoto

Albert Einstein Institute

2009 September 21 ET WP3 teleconference

Summary of my report

(1) Upper limit of *R* (strength of instability)

Upper limit of *R* of Einstein Telescope is almost same as that of Advanced LIGO and LCGT.

(2) Number of unstable modes and mirror curvature dependence

LCGT : Less unstable modes and weak curvature dependence

Cooled mirror for thermal noise reduction (sapphire mirror and normal beam radius)

ET : Many unstable modes and strong curvature dependence

Cooled mirror but larger beam radius and longer arm for thermal noise reduction

(3) Instability suppression

Q reduction (elastic mode) by barrel barrel surface loss is effective, but thermal noise is comparable with (or larger than) goal sensitivity.

Do not be too pessimistic, but pay attention.