

## Large-band tiltmeters for Newtonian Noise studies in Virgo and ET detectors

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In the field of gravitational waves detectors, seismic activity is a source of noise that can affect the sensitivity of the apparatus in many different ways. The most direct way consists in the shaking of the test masses induced by seismic activity; nonetheless, test masses can also be moved by a time-dependent gravity gradient generated by seismic activity (the so called Newtonian Noise). Direct seismic noise at low frequency is well monitored in all gravitational wave detectors and it is heavily suppressed by using actively-controlled multi-pendulum stages. Gravity gradient noise is not limiting the sensitivity of the second generation of GW detectors, but it could be a limiting noise for the next generation (like the Einstein Telescope) and thus it is useful to develop high-precision tiltmeters in order to monitor seismic activity, reconstruct the gravity gradient in time and subtract this noise passively or actively. Up to now, INFN Napoli group is producing large frequency band tiltmeters to both study Newtonian Noise and provide an extra sensor for seismic monitoring at low frequency. The first of this new tiltmeters has been recently installed in Virgo and it will acquire data during the whole Virgo scientific run O4.

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