





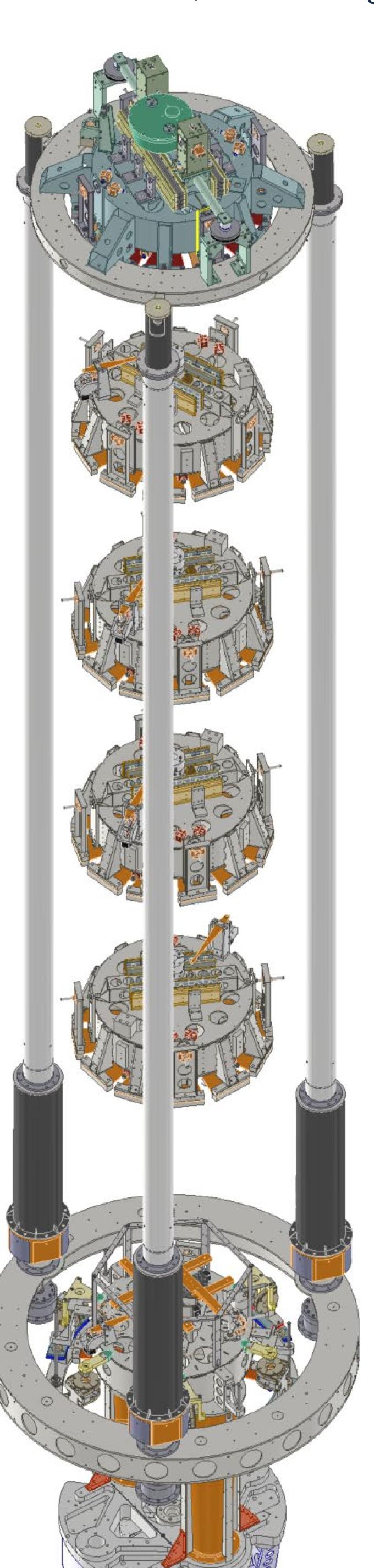




The Superattenuators for the CAOS Project

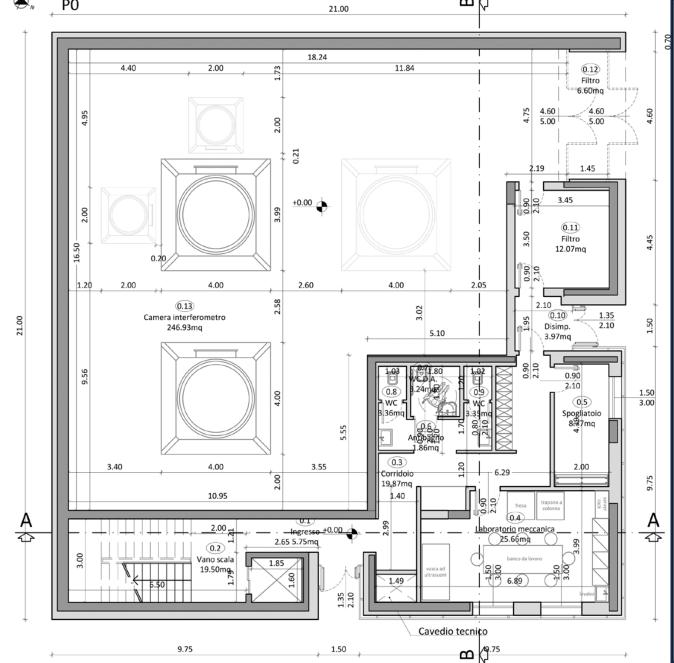
D. Aisa ¹, N. Baldicchi ¹, S. Baldoni ², F. Bianchi ², G. Capoccia ², A. Casella ^{3, 4}, P. Chessa ¹, F. Frasconi ³, A. Gennai ³, L. Lucchesi ³, L. Orsini ³, A. Parisi ¹, F. Pilo ³, P. Prosperi ³, F. Spada ³, H. Vocca ¹

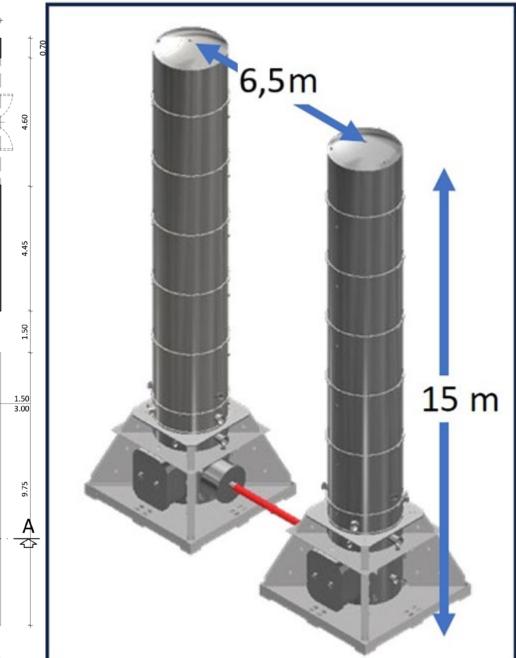
1) Università degli studi di Perugia; 2) INFN Sezione di Perugia; 3) INFN Sezione di Pisa; 4)Galli & Morelli S.r.l.



CAOS (Centro per Applicazioni sulle Onde Gravitazionali e la Sismologia - Center for Gravitational Waves and Seismology) is a facility of the University of Perugia (Italy), where new technologies for seismic noise and local disturbances suppression will be developed.

The laboratory is under construction and it will host a 6,5m long Fabry-Perot cavity (with the possibility to implement in the future a full Michelson interferometer), equipped with Superattenuators similar to the Advanced VIRGO ones and developed by the INFN Pisa group and UNIPG-INFN Perugia group.





The "traditional" research line based on the AdV Superattenuators (Inverted Pendulum, Filter Chain, Payload) is considered the baseline solution in the ET Conceptual Design.

For the HF interferometer, the AdV Superattenuator with 6 filters in an "equally spaced" configuration complies as it is (with a total pendulum length of about 9 meters) with the ET requirements. For the LF interferometer, the Superattenuator's total pendulum length must be increased to approximately 17 meters.

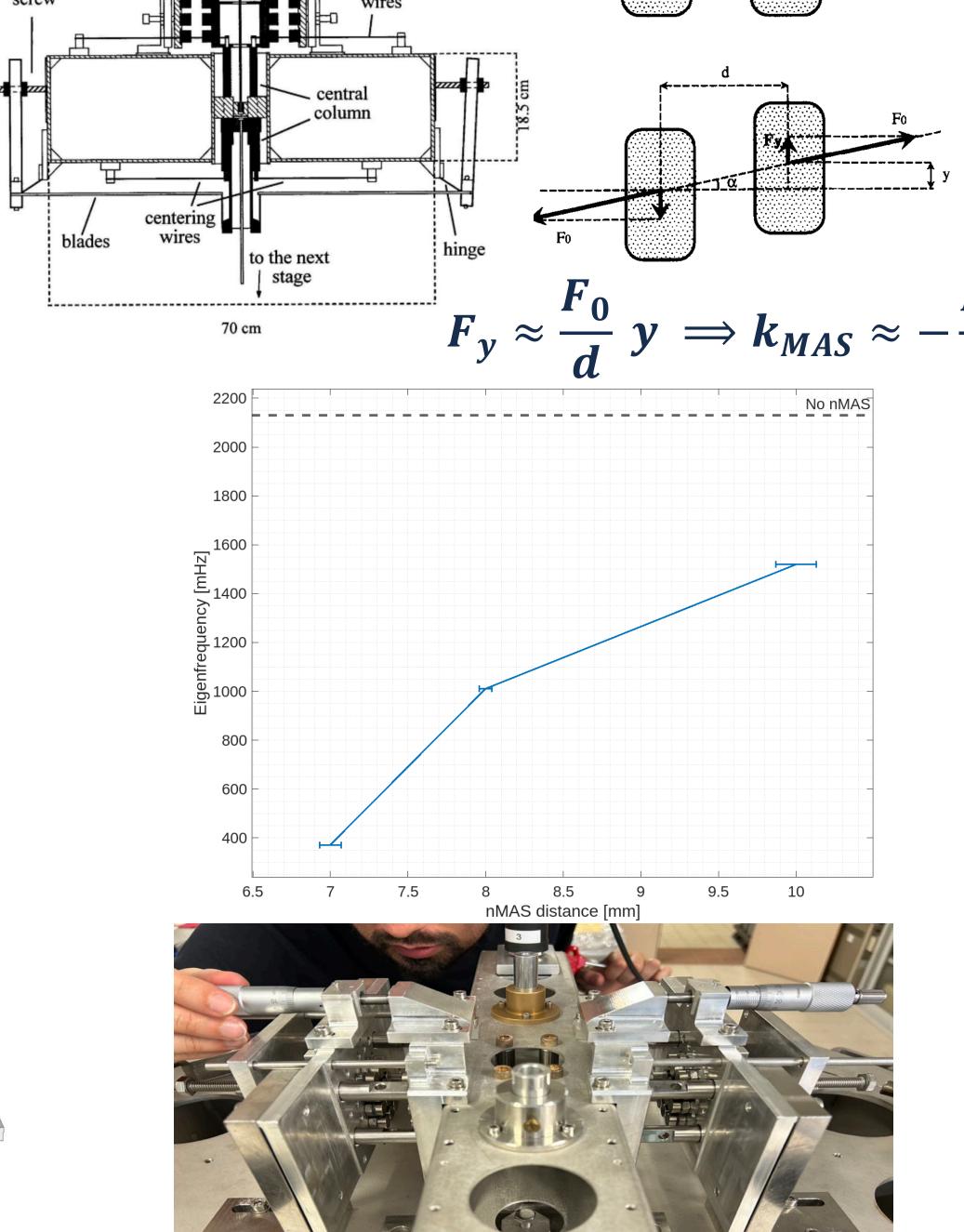
CAOS Superattenuators will allow for testing the technology proposed in the ET CDR, while providing an almost 1:1 scale R&D testing facility for specific Superattenuator items.

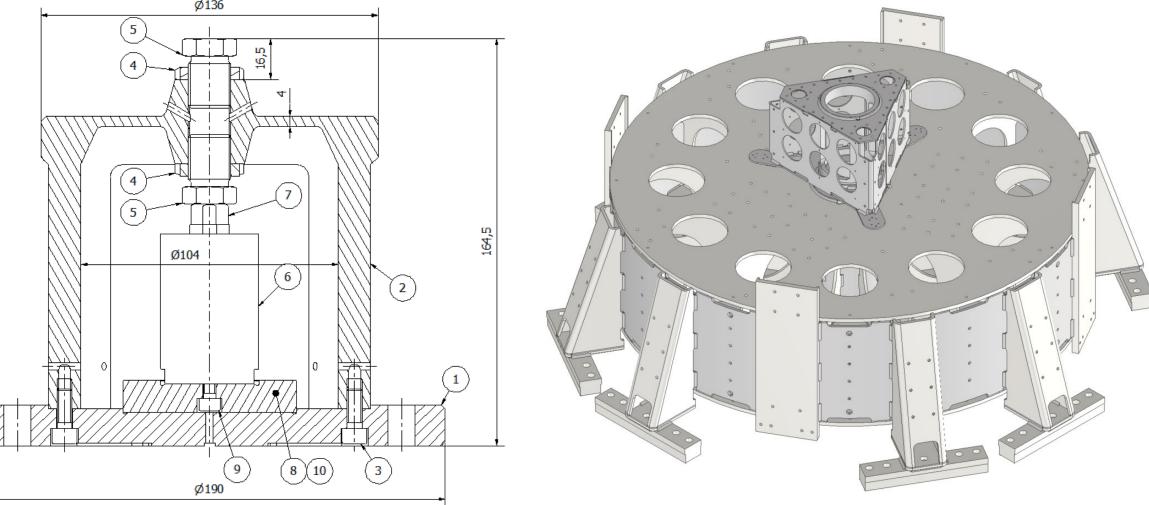
As CAOS gives the chance to design and build two Superattenuators, it has been decided to diversify their design:

The "Beam Splitter" (BS) Superattenuator will be very similar to AdV Superattenuators (except for the height) to have a "technology benchmark";

The "East End" (EE) Superattenuator will help exploit new technologies to perform dedicated R&D on them. So far, the plan is to test new active platform monolithic "feet", a different Filter O approach ("Disk O"), and a new filter crossbar.

It has also been decided to install **new magnetic anti-springs** (nMAS) on both Superattenuators. This choice is because magnets used for the MAS of AdV have become obsolete and are difficult to source. Moreover, we already have preliminary encouraging experimental results about the selected nMAS.





Galli & Morelli is officially in charge of producing the mechanics of the two Superattenuators.

Currently, standard filters are in production, while the Reference Structures, Base-rings, Disk O, Steering Wheels, and Payloads are in the design phase.



