

# Report on the scientific activity of the University of Perugia

Helios Vocca – University of Perugia



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Commission

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# Activities

Five secondments in Japan and one in US:

1. 07/07/2017 – 11/09/2017 NAOJ (Tokyo)
2. 27/06/2018 – 14/07/2018 ICRR, The University of Tokyo
3. 24/08/2018 – 13/10/2018 ICRR, The University of Tokyo
4. 17/03/2019 – 23/03/2019 CALTECH
5. 14/04/2019 – 22/04/2019 ICRR, The University of Tokyo
6. 17/07/2019 – 28/07/2019 ICRR, The University of Tokyo

# Collaboration

- ICRR (part of University of Tokyo) and NAOJ are the funding institutions of the Kagra experiment and participates in its construction.
- Since years we collaborate with the scientific groups from National Astronomical Observatory of Japan (NAOJ) led by prof. Takayuki Tomaru and from Institute for Cosmic Ray Research (ICRR) led by dr Takafumi Ushiba.
- Since 2019 I am also part, as the European representative, of the experiment Executive Office (EO).

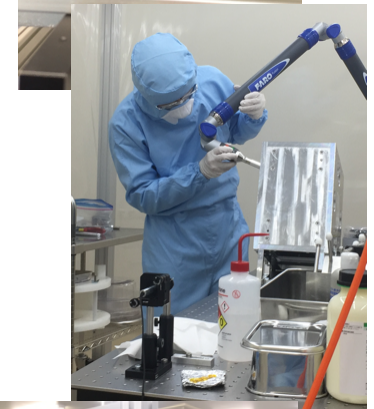
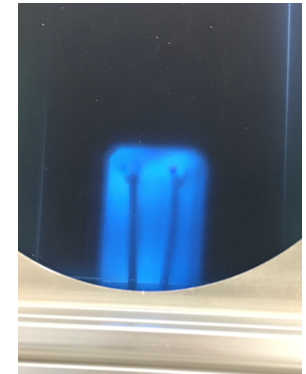
# Secondment topic

(NAOJ 07/07/2017 – 11/09/2017)

The secondment aim has been to collaborate on the development of a sapphire cryogenic suspension for the KAGRA optics:

- Measuring the stress distribution on some mechanical components (the blade springs).
- Testing and organizing the HCB procedure for bonding the lateral sapphire “ears” to the experiment final optics.
- Designing the whole mechanics and procedure for the final optics installation.

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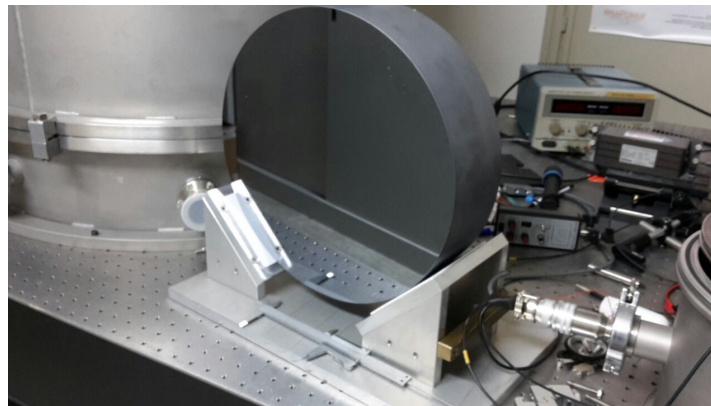


# Secondment topic

(ICRR 27/06/2018 – 14/07/2018)

The secondments has been both to **Seoul** for the participation to the Kagra International Workshop (3 days) and then to **ICRR** in Japan to work on a first prototype of a silicon cryogenic suspension for the 3<sup>rd</sup> generation detectors.

A Silicon mirror has been transferred to ICRR in December to start designing and testing a new kind of Cryo-suspension.

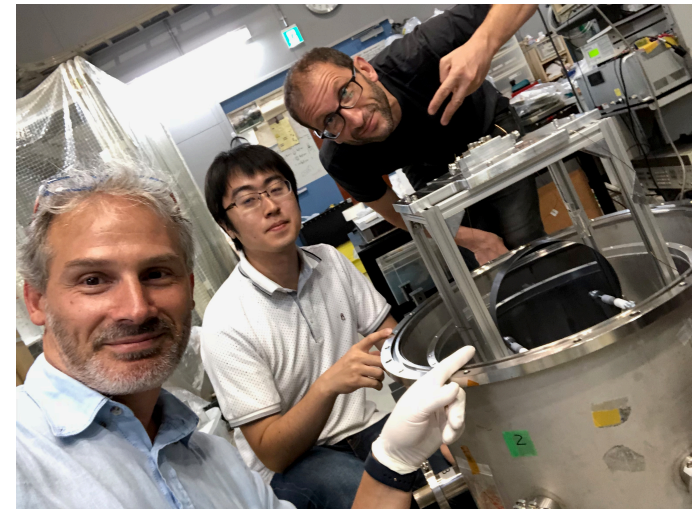


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# Secondment topic

(ICRR 24/08/2018 – 13/10/2018)

- UNIPG was seconded to **ICRR** (Japan) to work on the first prototype of a silicon cryogenic suspension for the 3<sup>rd</sup> generation detectors.
- The Silicon mirror transferred to ICRR was suspended with a Cu-Be wire in a cryostat for its characterisation.
- The thermal conductivity and the mechanical quality factors have been measured at 40K.



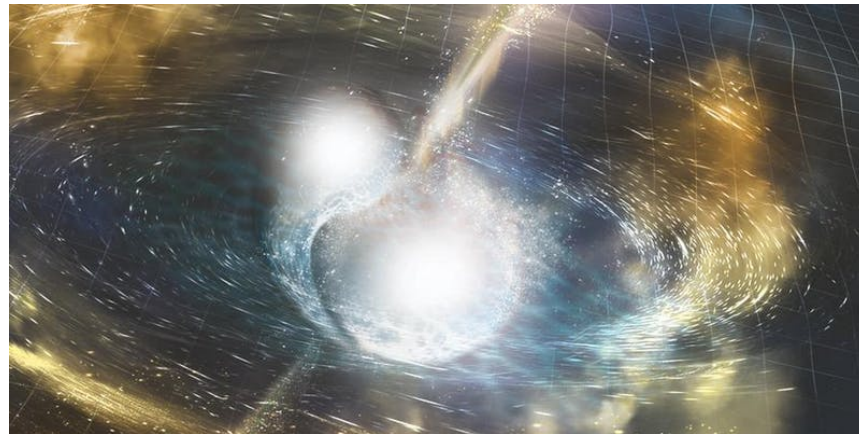
# Secondment topic

(CALTECH 17/03/2019 – 23/03/2019)

- The secondment to CALTECH was actually being done in Lake Geneva, Milwaukee (WI) to the participation to the LIGO/Virgo collaboration meeting (LVC).

## LIGO-Virgo Collaboration Meeting

18-21 March 2019

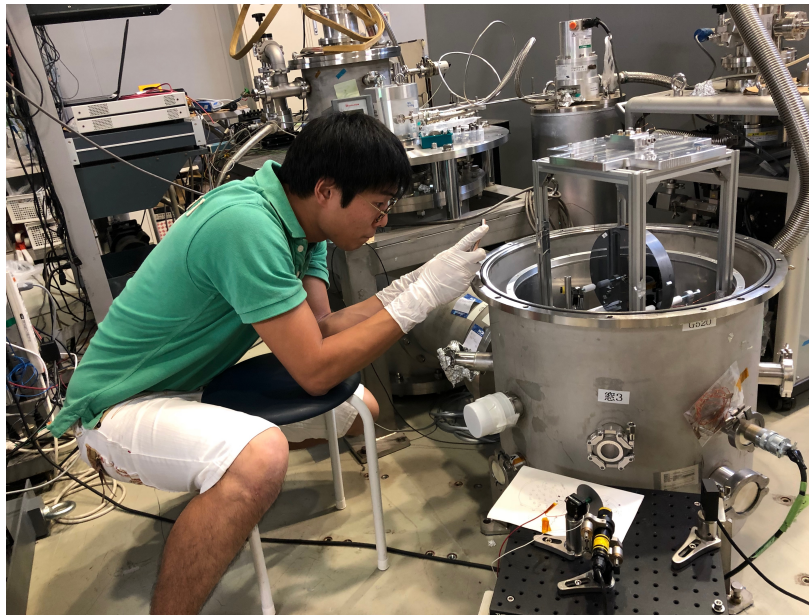


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# Secondment topic

(ICRR 14/04/2019 – 22/04/2019)

- The secondment to ICRR was devoted to the verification of the status of the ongoing measurements on the suspended cryogenic Si mirror and to the participation of the collaboration meeting (F2F) in Kashiwa.



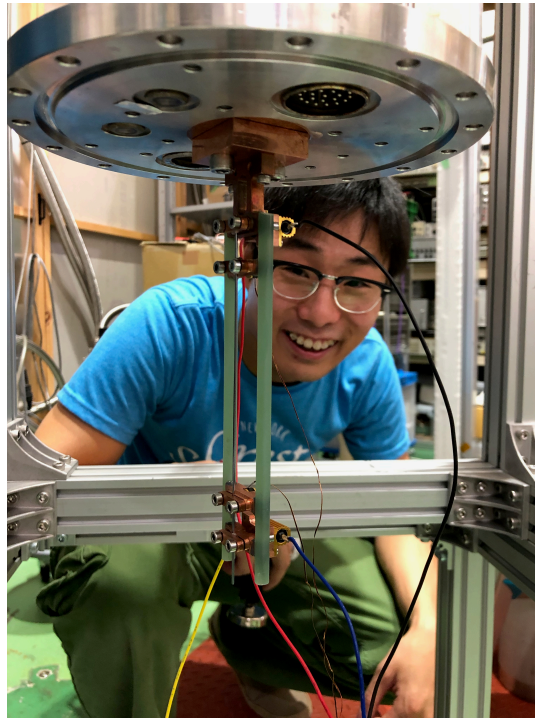
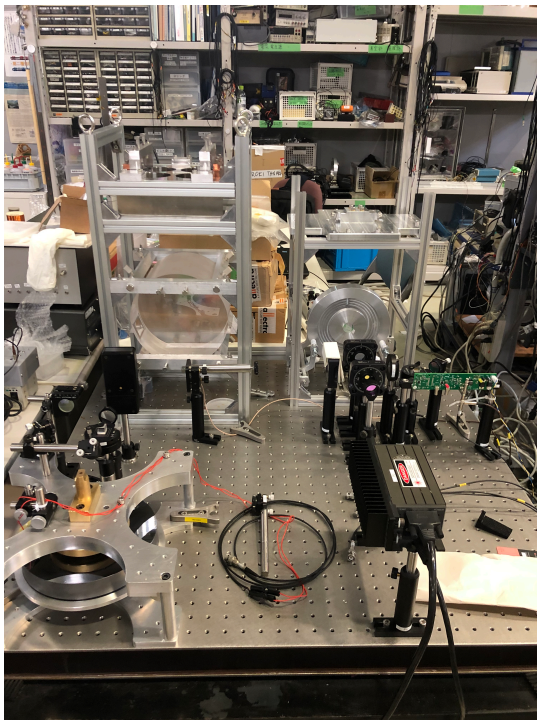
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# Secondment topic

(ICRR 17/07/2019 – 28/07/2019)

During this secondment two facilities were realised in ICRR from the Perugia group, to test the mechanical properties of Silicon bulks;  
In the meanwhile a monocrystalline silicon fiber was installed into a cryostat in KEK, in collaboration between ICRR/KEK and Perugia, to measure silicon thermal properties at cryogenic temperature.



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# Activities of UNIPG technicians

(Antonfranco Piluso and Damiano Aisa)

Some of the previous activities were possible because of the strong support of the mechanical workshop of the University of Perugia, for this reason their involvement in Japan was needed. The secondments are the following:

1. 11/08/2017 – 11/09/2017 NAOJ (Tokyo) – A. Piluso  
(supporting H.Vocca)
2. 01/12/2018 – 15/12/2018 ICRR – A. Piluso & D. Aisa  
(supporting F.Travasso)
3. 14/07/2019 – 30/08/2018 ICRR – A. Piluso & D. Aisa  
(supporting H.Vocca, M.Bawaj and F.Travasso)