OCRA

ACTIVITIES FALL 2022 AND SPRING 2023

Sabine Hemmer for the
OCRA collaboration

IPPOG Global Cosmics Steering Committee, 8 May 2023

ICD 2022

22 November 2022

OCRA PARTICIPATION IN ICD

19 in-person events: Bari, Catania, Ferrara (new), Firenze, Genova, Lecce, LNF (new), Milano Bicocca, Padova-LNL, Palermo, Pavia, Perugia, Pisa, Siena, Roma, Roma Tor Vergata, Sassari, Trento, Trieste

1 mixed-mode event : LNGS/GSSI

1 virtual event: Cosenza

Programme in all cases includes:

- introduction to cosmic rays
- measurement of the muon flux at several angles
- data analysis
- video call with other student groups

OCRA at ICD 2022 in numbers

3008 students

910 on-site/2098 remote

124 schools

109 on-site/15 remote

89 towns

77 on-site/28 remote

48 provinces

42 on-site/15 remote

Composition of the group of students that participated on-site:

- 350 female, 560 male
- 804 Liceo scientifico/scienze applicate, 73 ITIS, 21 Liceo classico, 11 Liceo linguistico, 1 Liceo economico sociale
- 561 fifth year, 228 fourth year, 95 third year (fifth year is the last year of high school)

Composition of the group of students that participated remotely:

- 1706 Liceo scientifico/scienze applicate, 327 ITIS, 65 Liceo classico
- 1092 fifth year, 622 fourth year, 312 third year

Distribution of schools that participated to the OCRA ICD 2022

OCRA ICD 2022

OCRA ACROSS ITALY

in collaboration with the INFN Communications Office

GALASSICA, ESANATOGLIA, JULY 2022

- Class for high school teachers
- 2 labs for kids between 11 and 13 years (based on the book “Space” by Sassi Junior)

BERGAMO SCIENZA, OCTOBER 2022

- 5 labs for middle and high school students

LES RENCONTRES DE PHYSIQUE DE LA VALLÉE D’AOSTE, AOSTA, MARCH 2023

- Talk and measurements of cosmic ray flux in the field with high school students in occasion of the scientific conference

PIERRE AUGER MASTERCLASS

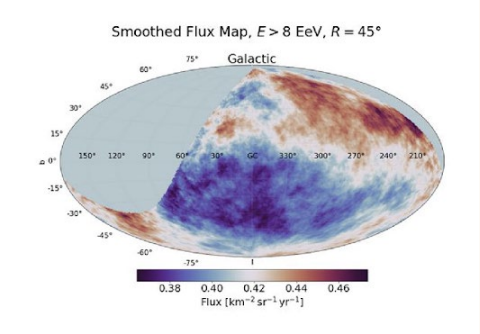
In May 2022 the first edition of the masterclass based on 10% of the released data of the Pierre Auger collaboration was organized

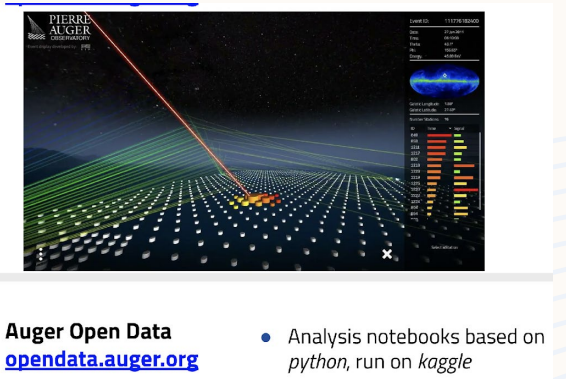
The masterclass took place in three Italian and three Portuguese institutes with about 80 students.

In March and April 2023 the second edition took place with participants from Portugal, Romania, Czech Republic, Italy and Algeria.

Since 2023 the masterclass is listed amongst those of **IPPOG**.

https://physicsmasterclasses.org/





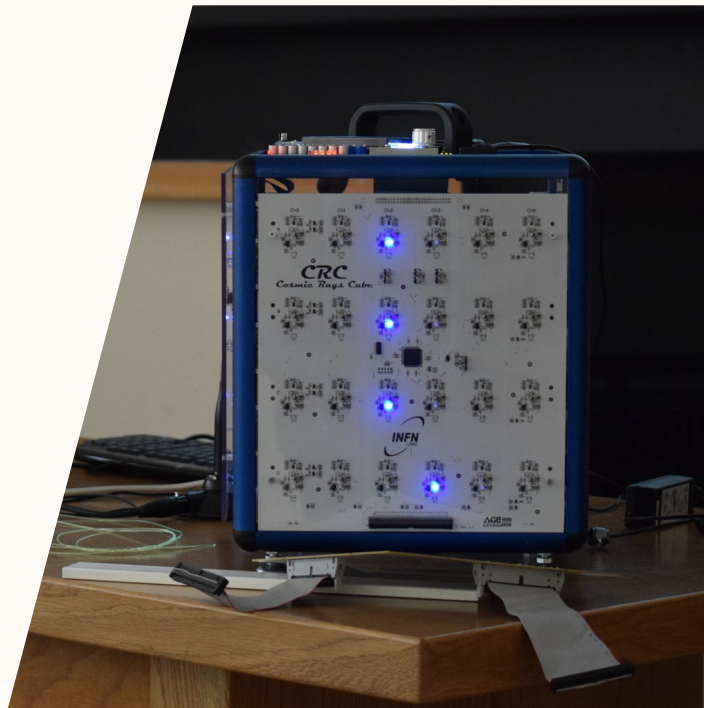
Auger Open Data
opendata.auger.org

- Analysis notebooks based on *python*, run on *kaggle*

CLASSES FOR TEACHERS 2023/2024

As part of the activities of **CTA+**, funded within the Italian PNRR call for infrastructures, **two classes on cosmic rays for high school teachers** will be organized

- 3 days at LNGS based on the Cosmic Ray Cube, 3 days in Padova based on experimental data analysis
- Several new Cosmic Ray Cubes for the participating institutions



PUBBLICATIONS

- C. Aramo, I. Veronesi (OCRA collab.), "An interdisciplinary path to the exploration of the Universe with the use of technologies for primary school students", (proceedings ICERI 2022), Electronic Conference Proceedings
- C. Aramo et al. (OCRA collab.), "Discovering cosmic rays with OCRA: online labs for students and teachers", (proceedings ICERI 2021), Electronic Conference Proceedings
- D. Liguori, D. Passarelli and M. Schioppa (OCRA collab), "MoCRiL: Pacini's experiment in a modern and educational way", proceedings CRIS2022 (submitted)
- S. Hemmer et al. (OCRA collab.), "OCRA – an outreach program on cosmic rays for teachers and students", proceedings CRIS2022 (submitted)
- S. Hemmer et al. (OCRA collab.), "Discovering cosmic rays with OCRA: outreach activities for students and teachers", (proceedings ICRC2021), PoS
- C. Aramo et al. (OCRA collab.), "The online laboratories for OCRA - Outreach Cosmic Ray Activities INFN project", (proceedings ICRC2021), PoS
- R. Colalillo and C. Aramo (OCRA collab.), "A scuola di Astroparticelle": a synergy between school education and scientific research", (proceedings ICRC2021), PoS
- V. Bocci et al. (OCRA collab.), "MoCRiS a low-cost stratospheric balloon platform to measure the particle flux of cosmic ray showers in the high atmosphere", (proceedings ICRC2021), PoS
- D. Liguori, D. Passarelli and M. Schioppa (OCRA collab.), "Measurement of the cosmic radiation flux in water as a function of detector depth", (proceedings SIF 2022), Il nuovo Cimento (submitted)
- V. Bocci et al. (OCRA collab.), "MoCRiL: l'esperimento di Pacini in una versione moderna e didattica", SIF Prima Pagina (submitted)

THANK YOU!

https://web.infn.it/OCRA/

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