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## Cosmic Muon Images: REINFORCE muon tomography citizen science demonstrator

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Cosmic Muon Images[1] is a citizen science project from the domain of muon tomography (muography) with the goal to use machine learning and exploratory data analysis to improve the discrimination between particle detector signal and the different kinds of background. It is one of the four citizen science demonstrators developed within the EU-funded (GA-872859) REINFORCE project[2] (Research Infrastructures FOR Citizens in Europe). It uses Zooniverse[3] platform to provide volunteers with images of data registered by particle detectors during muography experiments. These images are 3D and 1D representations of the charge deposits of particles on the detector scintillation planes during the registration of an event. Zooniverse provides the space to host the project as well as the tools for the processing of the data by the volunteers. With the guidance and support of Zooniverse staff we created a series of materials that address the scientific background of muography, explain the objectives of the project and guide the volunteers through the two workflows created for the processing of the data. Effort is also put towards the sonification of the data coordinated by the team behind SonoUno[4] sonorization software to make the project more inclusive towards users with different sensory styles that want to access and analyze our dataset. The demonstrator is now online since Jan. 11, 2022, within this period of three months we have seen more than 500 volunteers create more than 45,000 classifications while a series of talks and events is also planned to increase the engagement of our participants. These events will familiarize new people with our project while at the same time refresh the interest of our current volunteers by providing new insights on muon tomography objectives and trigger discussions on new detector technologies and future muography expeditions. A great effort is made towards the inclusion of school students through a series of schools and seminars co-organized together with other EU-funded projects (e.g. FRONTIERS Summer School 2021) since young people have much to gain from learning about interdisciplinarity between sciences and how scientists from different domains collaborate towards a common goal.

[1] <https://www.zooniverse.org/projects/reinforce/cosmic-muon-images>

[2] <https://www.reinforceeu.eu/>

[3] <https://www.zooniverse.org/>

[4] <http://sion.frm.utn.edu.ar/sonoUno/>

### In-person participation

No

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