@stephenserjeant

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Successes in open data and citizen science: ASTERICS and the Open Science Laboratory

Stephen Serjeant, UNOOSA workshop on the Open Universe Initiative, November 2017

Astronomy ESFRI & Research Infrastructure Cluster
ASTERICS - 653477

ASTERICS

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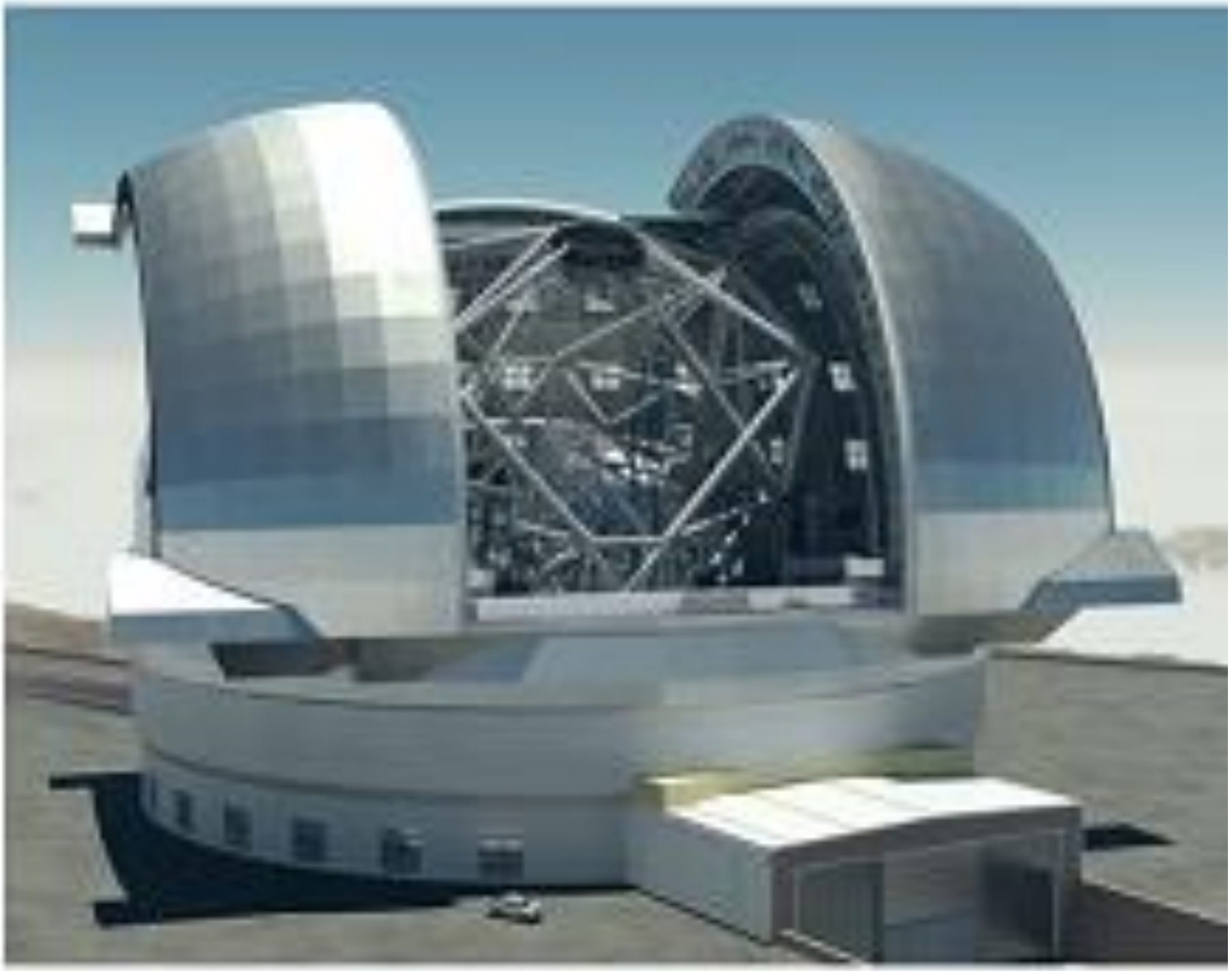
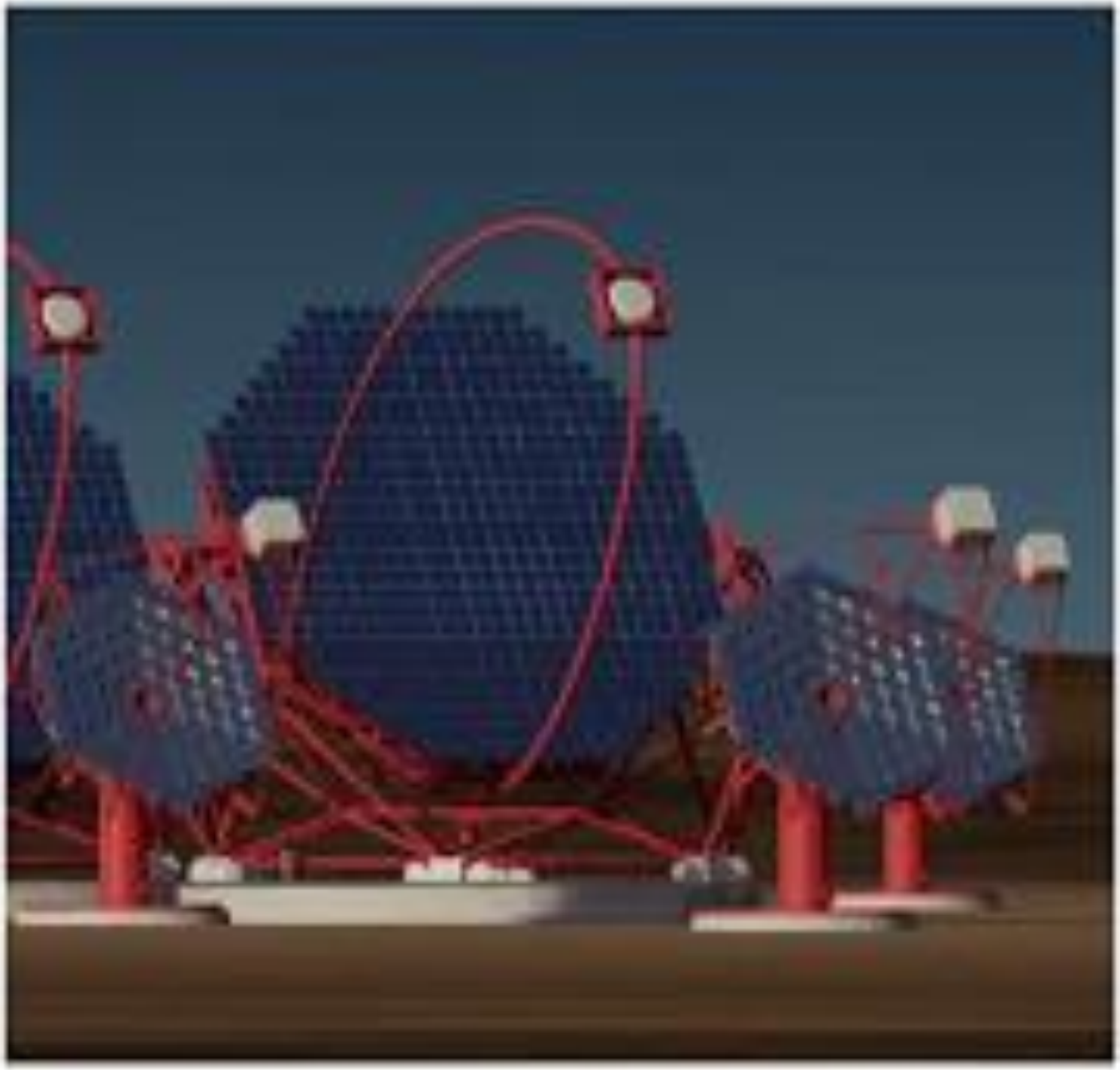
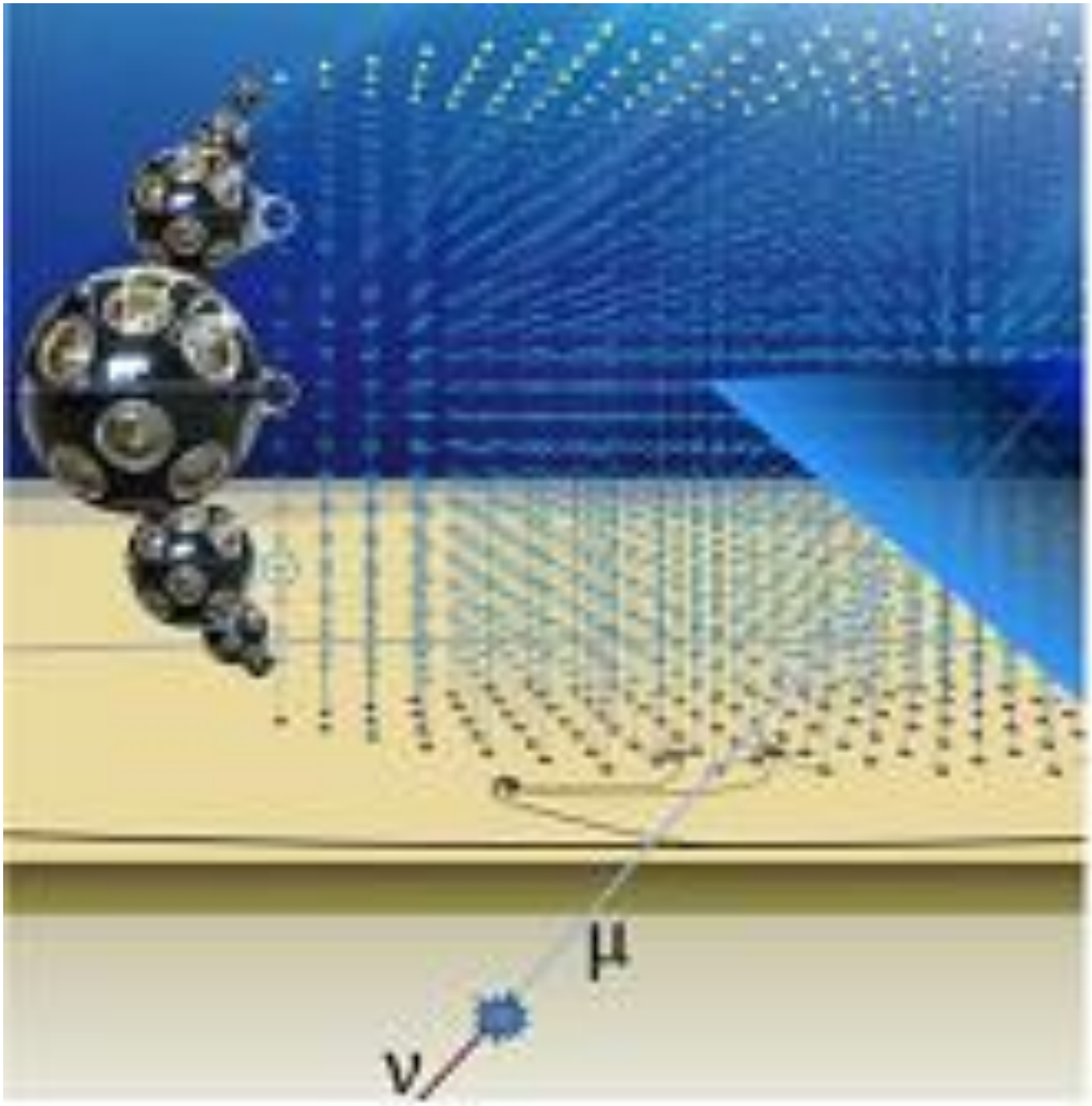
Astronomy ESFRI and Research Infrastructure Cluster

- Bringing together the astronomy, astrophysics and particle astrophysics communities
- Supporting the implementation of the ESFRIs to see them interoperate as an integrated, multi-wavelength and multi-messenger telescope



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Astronomy ESFRI and Research Infrastructure Cluster

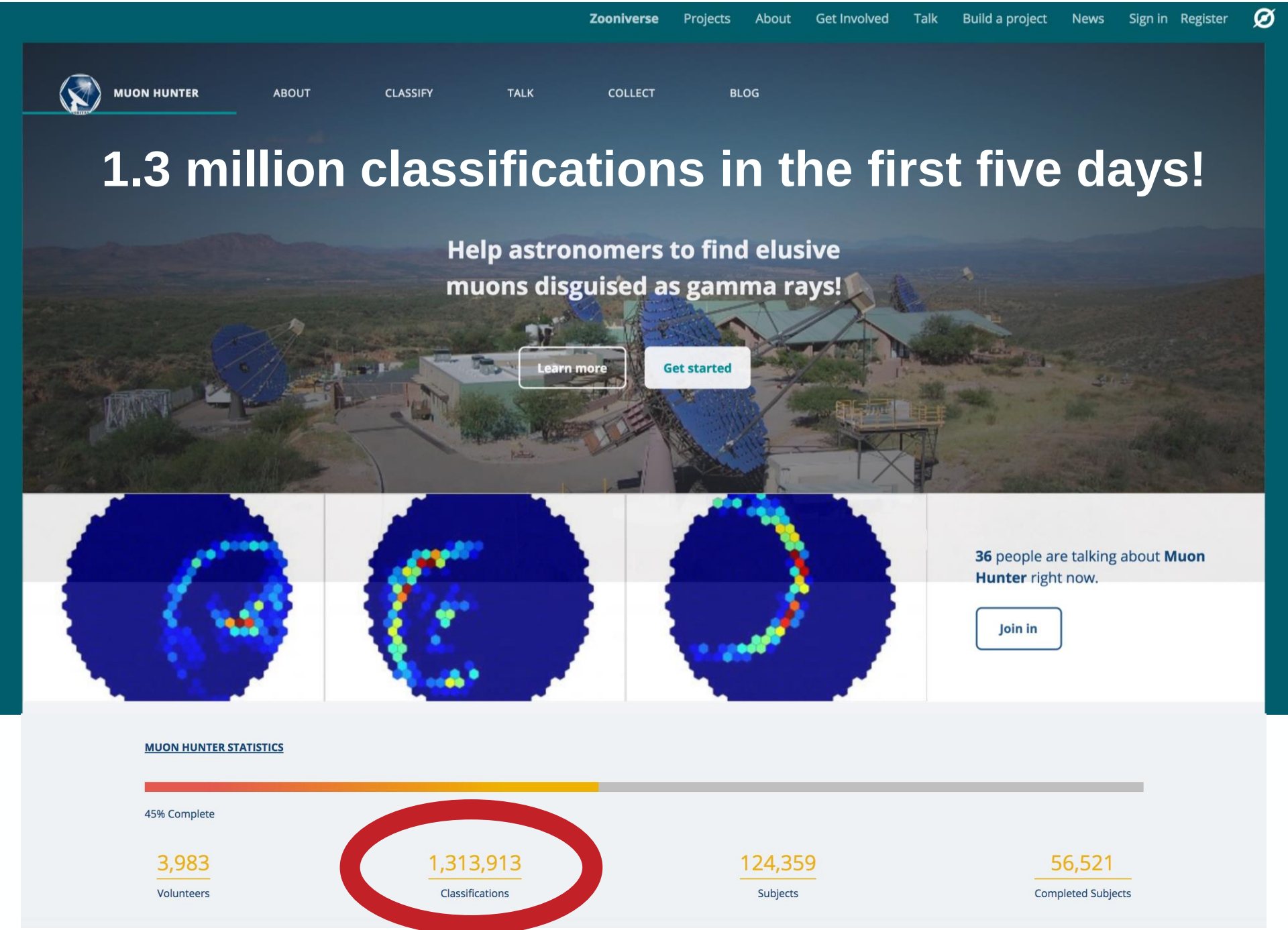
- Bringing together the astronomy, astrophysics and particle astrophysics communities
- Supporting the implementation of the ESFRIs to see them interoperate as an integrated, multi-wavelength and multi-messenger telescope
- **See Françoise Genova's talk earlier**
- DECS: Dissemination, Engagement and Citizen Science
- Open ESFRI facilities to wider stakeholders (Open Science, or 'Science 2.0') from technical communities to policy makers to general public
- Coordinated citizen science experiments
- "Democratising access to scientific information"

  → "Democratising knowledge discovery"

- **CITIZEN SCIENCE IS NOT OUTREACH!**

Muon Hunters

- Lead: Lucy Forston, CTA
- Science goal: detect fainter Cherenkov events by visual classification
- Activity: classify hadron vs. photon events in the CTA telescopes, morphologically and in the time domain; apply first to simulations and to e.g. HESS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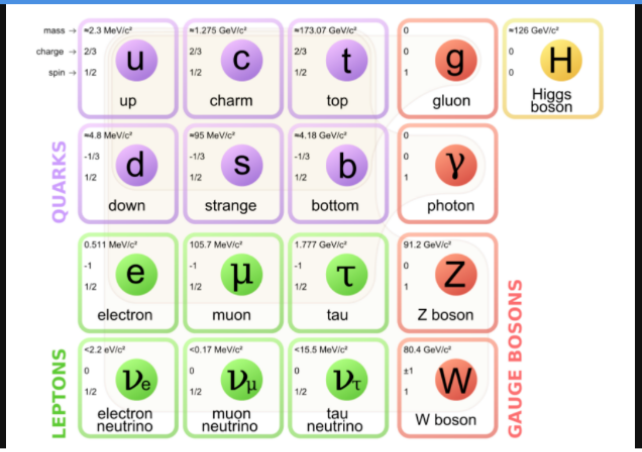


The 'standard model' of particle physics. The electron and muon can be found in green boxes halfway down the diagram.

So what is a muon?

A muon is a type of subatomic particle, which is very similar to an electron – for instance, they both have the same negative electric charge. The main difference between a muon and an electron is their mass. A muon is 207 times more massive than an electron! For comparison, you might have known that the mass of a proton (the nucleus of a hydrogen atom), is about 1,800 times that of an electron. However, unlike the proton, which has substructure and is composed of other particles, the muon is a fundamental particle in its own right.

If you think the existence of the muon is strange, you're in good company. The world-famous physicist I. I. Rabi, when first told of the discovery of the muon, said in response, "Who ordered that?" There's good reason why the muon is such an unfamiliar particle: muons are radioactive; they decay with a mean lifetime of 2.2 microseconds. That's 2.2×10^{-6} seconds, or 2.2 millionths of a second. Muons don't stick around long enough to become part of the matter we encounter day to day.

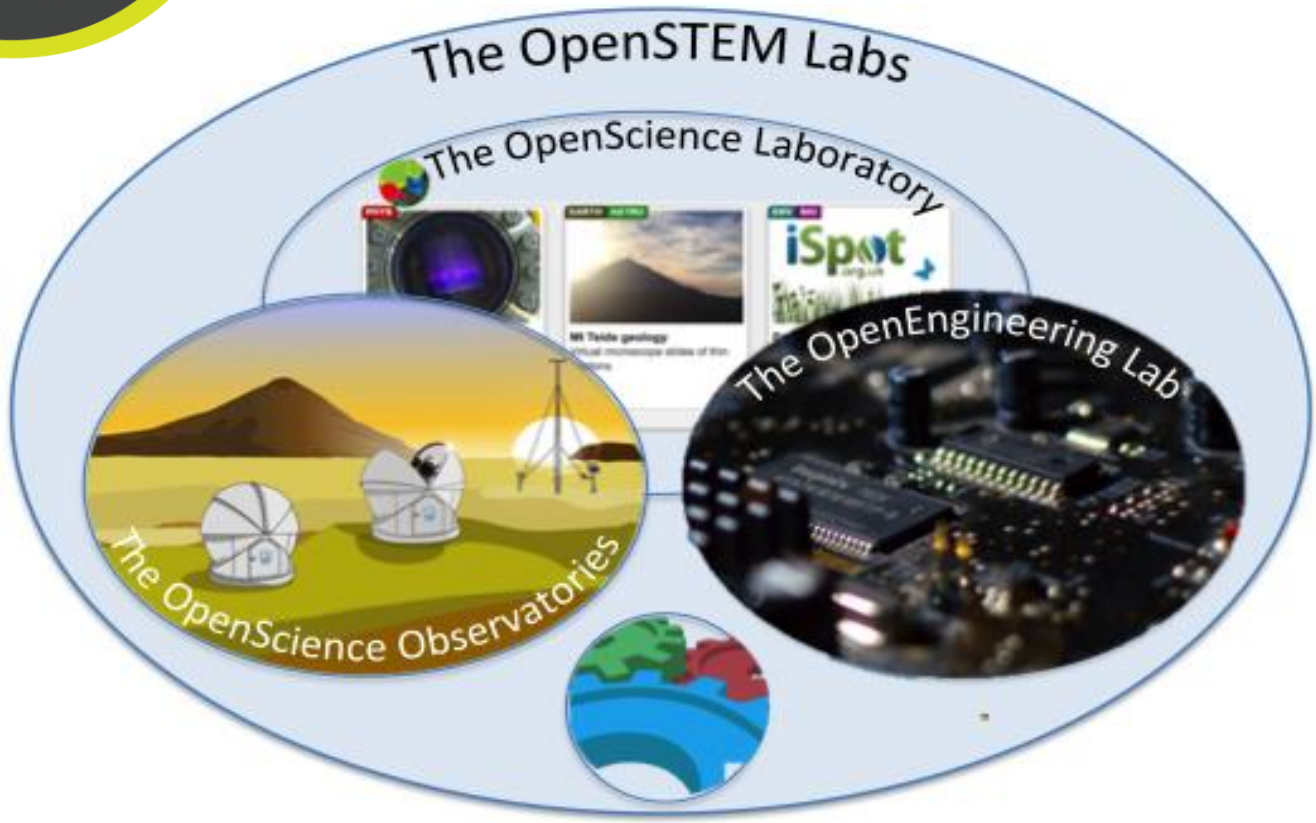
However, there are lots and lots of muons all around us, created in interactions we don't usually think of...

ASTERICS CITIZEN SCIENCE WORKSHOP

22-24 JANUARY 2018, INAF TRIESTE, ITALY

- Bring your ideas and let's make things happen! **Maybe on the spot**!
- Remember: citizen science is a *tool*, like a spectrometer.
- Science team involvement is important in experiment success
- What motivates citizen scientists?
  - How easy is it?
  - How beautiful is it?
  - How important is it?
  - How famous could I get?
  - How much am I learning?

OpenSTEM Labs



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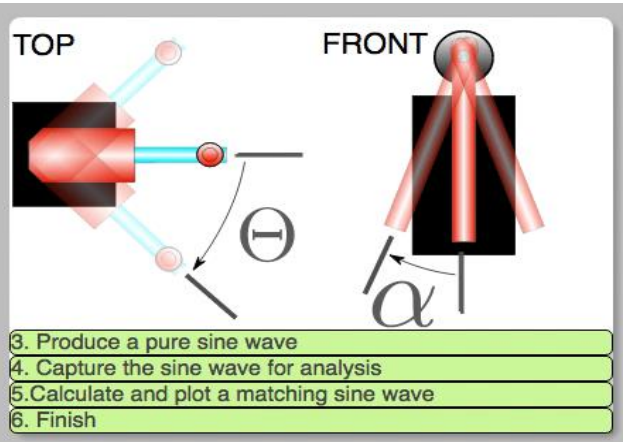
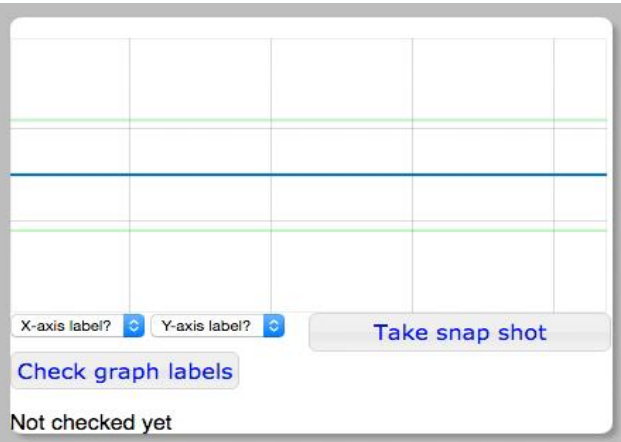
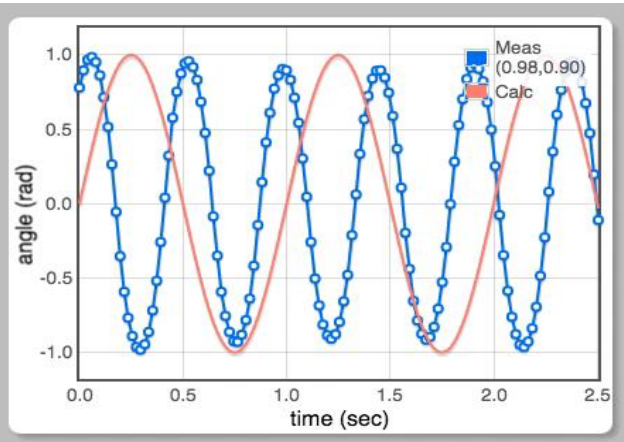
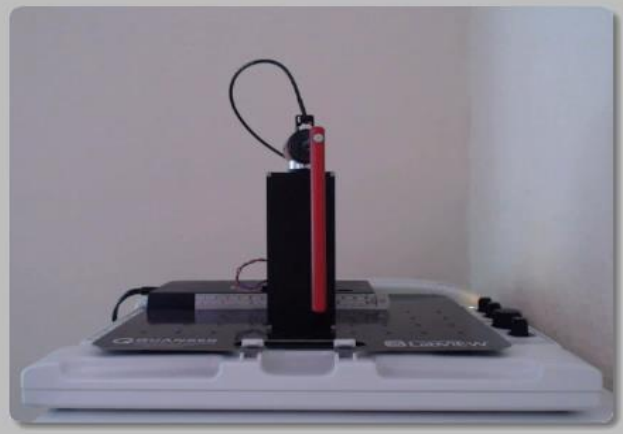
HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND hefce

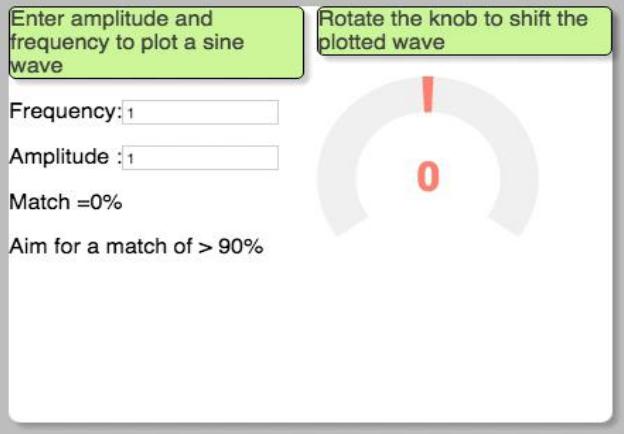
Video of connecting from Austin TX to UK

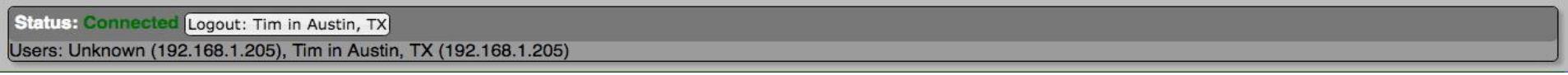












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Monstera - root

Plant tissues

Objectives

x20 x10 x40 x4 x2

Measurement

grid

graticule

rotate grid/ graticule

Focus

Lighting

Quiz

Description

Monstera, the Swiss cheese plant, is native to tropical regions of the Americas. It is a climbing evergreen monocot plant which has aerial roots that act as hooks over branches. The central polyarch vascular system contains prominent wide xylem vessels and phloem.

Tenerife Facilities

PIRATE and COAST

- 17 inch and 14 inch telescopes in robotic clam-shell domes
- Support real-time remote control and fully autonomous scheduling
- At a world-class observing site - Observatorio del Teide, Tenerife
- Provide time-domain astronomy for teaching and research

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V. Vikram,[231] A. R. Walker,[209] J. Weller,[219, 240, 224] and Y. Zhang[171]

The Dark Energy Camera GW-EM Collaboration and the DES Collaboration

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The DLT40 Collaboration

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Dovi Poznanski,[248] and Sergiy Vasylyev[246, 247]

The Las Cumbres Observatory Collaboration

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K. Ulaczyk,[250] D. Watson,[251] and K. Wiersema[249, 250]

The VINROUGE Collaboration

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But: small facilities of this kind are typically

NOT F.A.I.R.

Findable, Accessible, Interoperable, and Re-usable

CONCLUSIONS

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ASTERICS: spectacular success of Muon hunters citizen science

Come bring your citizen science ideas to Trieste on 22-24 Jan

Open Science Laboratory: extends access to research facilities – but in general small facilities have yet to meet F.A.I.R. aspirations

UNOOSA should endorse IVOA. Should Open Universe Initiative focus effort on use cases / policies / standards for public interfaces to IVOA & education?

What would you like a hundred thousand people to do for you?