

**2019 Winter institute on
Axions in Astrophysics and
Cosmology**

Report of Contributions

Contribution ID: 1

Type: **not specified**

Astrophobic Axions

Monday, 21 January 2019 14:30 (30 minutes)

Reliable estimates of the allowed range for axion couplings to photons, nucleons and electrons are of major importance for determining the viable axion mass window as well as to focus experimental axion searches.

We show that in a class of generalized DFSZ axion models with generation dependent Peccei-Quinn charges the axion couplings to nucleons and electrons can be simultaneously suppressed, thus relaxing the limits on the axion mass from the SN1987A burst duration and from white dwarf cooling.

Presenter: NARDI, Enrico

Contribution ID: 2

Type: **not specified**

Peccei-Quinn Symmetry as a Flavor Symmetry

Monday, 21 January 2019 15:00 (30 minutes)

There has been recent interest in possible connections between a Peccei-Quinn (PQ) symmetry and quark flavour structures. I describe how a generic generation-dependent $U(1)$ symmetry acting on the quark Yukawa operators can reduce the number of free parameters in the quark sector. The maximal reduction compatible with CP violation yields nine real parameters and one phase, which matches the number of physical observables, implying that such models have no free parameters. This has several interesting consequences: (i) there are only two inequivalent textures, each one giving rise to six different models depending on quark flavour assignments, (ii) the $U(1)$ symmetries that generate these textures all have a QCD anomaly, and hence are PQ symmetries, (iii) the resultant axion has flavour-violating couplings to quarks, which can be probed in meson decays, (iv) in some cases the contributions to the QCD anomaly of two generations cancels out, opening up the possibility that the axion coupling to nucleons is strongly suppressed.

Presenter: BJORKEROTH, Fredrik (INFN-LNF)

Contribution ID: 3

Type: **not specified**

Future challenges for Axion Physics

Tuesday, 22 January 2019 14:30 (1 hour)

In this talk, I want to provide with some topics that I consider interesting to be explored in the near future. In particular, I will discuss a few ideas for small and big projects that could be developed in relation with axion physics, with a particular attention to the role of substructures.

Presenter: VISINELLI, Luca

Contribution ID: 4

Type: **not specified**

Bounds and Hints on Axions from Stars

Wednesday, 23 January 2019 14:30 (1 hour)

Stars are powerful laboratories to study light, weakly interactive particles. In particular, considerations about stars and stellar evolution have led to strong bounds on axion like particles (ALPs), hidden photons, anomalous electromagnetic properties of neutrinos, etc. More recently, observations of excessive stellar energy losses have led to the appealing idea that new-physics (most likely, ALPs) may be playing a role in stellar cooling. I will review the stellar bounds and hints on ALPs and discuss the current experimental potential to probe the hinted parameter space.

Presenter: GIANNOTTI, Maurizio