ACCADEMIA NAZIONALE DEI LINCEI

Conference

QUASICRYSTALS: STATE OF THE ART AND OUTLOOKS

18 NOVEMBER 2022

Organizing committee: Vincenzo AQUILANTI (Linceo, Università di Perugia), Luca BINDI (Coordinator, Linceo, Università degli Studi di Firenze), Giovanni FERRARIS (Linceo, Università di Torino), Massimo INGUSCIO (Linceo, Università Campus Biomedico di Roma), Stefano MERLINO (Linceo, Università di Pisa), Annibale MOTTANA (Linceo), Carlo SBORDONE (Linceo, Università degli Studi di Napoli "Federico II")

PROGRAMME

In the frame of the 2022 International Year of Mineralogy, we would like to propose a meeting on quasicrystals, materials which were discovered in nature about 15 years ago.
Solids are classified according to the order and rotational symmetry of their atomic arrangements. Glasses and amorphous solids have disordered arrangements with no exact rotational symmetry. Crystals have atomic structures with long range periodic order, that can be described by a single atom or atomic cluster that repeats at regular intervals. According to the well-known theorems of crystallography derived nearly two centuries ago, the rotational symmetries of crystals are highly restricted: two-, three-, four- and six-fold symmetry axes are allowed, but five-, seven- and all higher-fold symmetry axes are forbidden. Quasicrystals, short for quasiperiodic crystals, have a more subtle kind of long-range order. In a quasiperiodic structure, the atomic positions along each symmetry axis are described by a sum of two or more periodic functions whose wavelengths have an irrational ratio (inexpressible as a ratio of integers). This difference exempts quasicrystals from the crystallographic restrictions: they can exhibit all the rotational symmetries forbidden to crystals, including five-fold symmetry. The meeting will provide an excellent opportunity to present and learn the latest results in the fields of quasicrystals, complex metallic alloys and related topics. The research is highly interdisciplinary, so that the topics include mathematics, physics, chemistry, metallurgy, materials science and geoscience.

Friday, 18 November

9.00 Giorgio PARISI (Presidente della Classe di Scienze Fisiche, Matematiche e Naturali): *Welcome and Opening remarks*

9.30 Sander VAN SMAALEN (Universität Bayreuth Germania): *Aperiodic crystals and their atomic structures in superspace: An introduction*

10.10 Paul STEINHARDT (Princeton University): *Quasicrystals and beyond*

10.40 Coffee break

11.00 Marc DE BOISSIEU (CNRS - Francia): *Physics of quasicrystals: phonons and phasons*

11.30 Jean-Marie DUBOIS (Institut Jean Lamour - Francia): *Potential and marketed applications of quasicrystals*

12.00 Carlo SBORDONE (Linceo, Università degli Studi di Napoli "Federico II"): *Mathematical aspects of quasicrystals*

12.30 Discussion

12.45 Break

14.00 Emil MAKOVICKY (University of Copenhagen - Danimarca): *Quasicrystals and Art: interesting new facts*

14.30 Diederik WIERSMA (Presidente dell'istituto Nazionale di Ricerca Metrologica): *Structured photonic materials and quasicrystals*

15.00 Leonardo FALLANI (Università degli Studi di Firenze): *Quantum transport of matter waves in quasiperiodic crystals of light*

15.30 Michael WIDOM (Carnegie Mellon University - Pittsburgh, PA): *Atomistic simulation of quasicrystals*

16.00 Coffee break

16.20 Luca BINDI (Linceo, Università degli Studi di Firenze): *Natural quasicrystals and beyond*

16.50 Vincenzo STAGNO (Sapienza Università di Roma): *Quasicrystals at high pressure and high temperature*

17.20 Discussion, final remarks and outlooks

MINERALOGY 2022

Anno Internazionale della Mineralogia

ROMA - PALAZZO CORSINI - VIA DELLA LUNGARA, 10
Segreteria del convegno: convegni@lincei.it – https://www.lincei.it

Tutte le informazioni per partecipare al convegno sono disponibili su:
https://www.lincei.it/it/manifestazioni/quasicrystals-state-art-and-outlooks-conference

Nel rispetto delle limitazioni imposte per l'emergenza Covid-19, il numero dei posti in sala sarà limitato (vedi: https://www.lincei.it/it/news/misure-fronteggiare-lemergenza-epidemiologica).
Si prega di segnalare la presenza alla segreteria del convegno
Fino alle ore 10 è possibile l'accesso anche da Lungotevere della Farnesina, 10
I lavori potranno essere seguiti dal pubblico anche in streaming