

(some) Questions to be addressed at this meeting



« I feel qualified to provide some questions but not to give the talk since the conference is much broader than I am!

why not send an email to all the attendees asking them to send in their questions ? » Adam Riess

**By the following list of questions e-mailed by some of you (not so many !)
and submitted by a very unqualified and naive person.**

Pierre Pétroff (LAL Orsay France)

The fundamental big questions as raised by Michael Turner:

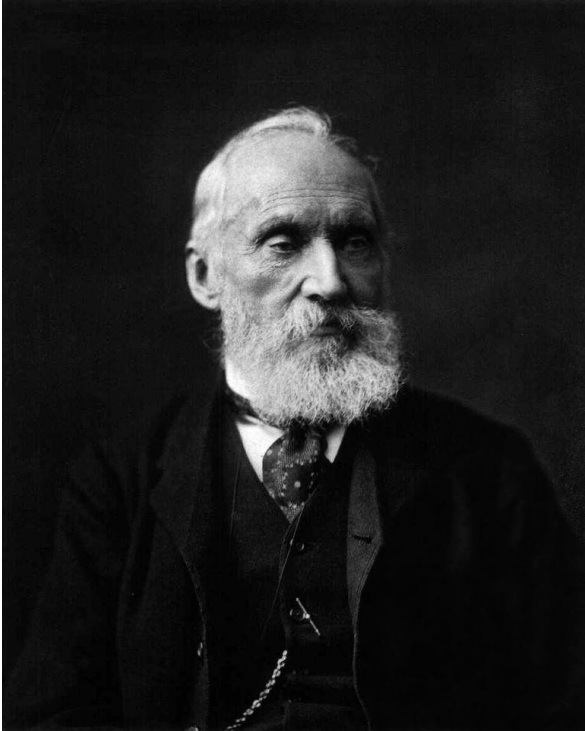
- How are the forces and particles of nature unified ?
- What is the origin of space, time and the Universe ?
- How are quantum mechanics and general relativity reconciled ?
- How did the baryonic matter arise in the Universe ?
- What is the destiny of the Universe ?
- What is the nature of the dark matter that holds the Universe together and of the dark energy that is causing the expansion of the Universe to speed up ?

(arXiv:0706.2186v2 [astro-ph] 26 June 2007)

We do hope that this workshop will be able to partially address some of these fundamental questions !

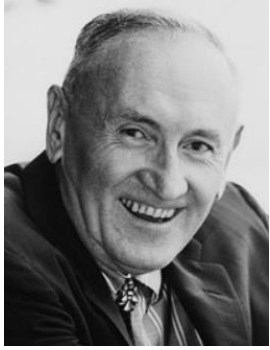
But we have to be humble and let us book some questions to be addressed at the next EDSU2019 meeting !

Two little clouds !



William Thomson (Lord Kelvin) in 1900:
Physics is over, except two small clouds on the horizon:
These clouds turned out to be the clues that led us to
quantum mechanics and relativity theory

In the questions reported here, we can notice that some of them are
pointing onto some clouds which could ushered in new discoveries !



Fritz Zwicky



Vera Rubin

Dark Matter (by far the most popular !)

Kazuhiko Hara hara@hep.px.tsukuba.ac.jp

I am sure there are good reasons for the mass ranges we are looking for, but want to know the reason that the currently exploring range and/or the achieved sensitivity is not enough ?

Xavier Bertou bertou@gmail.com

Now that the WIMP window is closing, how well motivated are the candidates for Dark Matter?

Tommaso Dorigo tommaso.dorigo@gmail.com

Is the neutralino miracle still there after the latest LHC exclusions?

Aldo Morselli aldo.morselli@roma2.infn.it

How can we discover the nature of Dark Matter?

Aaron Vincent aaron.vincent@queensu.ca

**-How do we get the biggest bang for our experimental buck in the search for particle dark matter? Do we keep going with WIMP searches? Are tabletop experiments the future?
-Have astrophysical anomalies cried wolf too many times, or will they point the way to dark matter discovery?**

Germán Gómez-Vargas ggomezv@uc.cl a little cloud ???

How established is the core/cusp problem in dark matter halos of galaxies ?

I do hope these questions will help for the DM round table discussion !!

Cosmology (Neutrinos, Dark Energy, Gravity, Black Holes)

Adam Riess ariess@stsci.edu and Mickael Rigault m.rigault@ipnl.in2p3.fr

How serious is the tension between LambdaCDM and cosmological observations ?

One more cloud at the horizon ?

Ian Moss ian.moss@newcastle.ac.uk

How serious is the tension between the Standard Model of Particle Physics and cosmological observations ?

Bruce Hoeneisen bruce1@fnal.gov clouds ..clouds ...

The Planck analysis assumes $\sum m_\nu = 0.06$ eV. How do the results change with the assumption $\sum m_\nu = 0.6$ eV?

In particular, how do h and the spectral index n change?

How to resolve the discrepancy between the direct and indirect measurements of H_0 (that has gotten worse with PDG 2018, and MANY precise measurements seem to rule out the Hubble direct result)?

What do we know at present about the relationship between the power spectrum of linear density perturbations $P(k)$ and the galaxy power spectrum $P_{gal}(k)$? This knowledge is necessary to interpret DES and SDSS.

And, of course, who will win the World Cup!



Laurent Chevalier laurent.pascal.chevalier@gmail.com

What is the present status which describe gravity as an entropic force?

Juan Garcia Bellido juan.garciabellido@gmail.com

Are LIGO black holes primordial or astrophysical?

Nick Gorkavyi gorkavyi@gist.us

If the Dark Matter consists of black holes of LIGO masses, how did the Universe accumulate such a number of massive black holes?

Francesca Vidotto vidottof@gmail.com

Can we explain the dark matter and dark energy only in terms of gravity?

More explicitly:

Dark Matter: Could it be primordial black holes? Or could it be a pure gravitational effect like in the different emergent/entropic/quantum gravity scenarios?

Dark Energy: Is Lambda enough? If we want to *explain* the presence of Lambda, can we do it using just (quantum) gravity?

Thomas Buchert buchert@ens-lyon.fr

Einstein's theory demands inhomogeneities in geometry given inhomogeneities in the energy-moment tensor, while the standard model of cosmology assumes a homogeneous geometry.

- Can we explain Dark Energy and eventually Dark Matter as an effect of geometrical inhomogeneities, at least partially ?**
- Can we explain modified gravity effects through nonlinearities of classical general relativity ?**
- Can we observe deviations from a FLRW geometry ?**

Anonymous a cloud

Is Lepton Flavor Violation in B decays confirmed ? What are the implication in cosmology ?

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Organizers: Carlos Montufar Freile and Bruce Hoeneisen