

**SEMINARS IN
STATISTICAL PHYSICS AND
PARTICLE PHYSICS
JOINT LECTURE**

22nd June 2016
Wednesday, **14:15**
Room **7.59**

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On the track of the dark forces

Electron-positron angular correlations were measured for the magnetic dipole 17.6 MeV and the 18.15 MeV transitions in ^8Be . Significant enhancement relative to the internal pair creation was observed at large angles in the angular correlation for the 18.15 MeV transition with a confidence level of $> 5\sigma$. This observation might indicate that, in an intermediate step, a neutral particle with a mass of $16.70 \text{ MeV}/c^2$ was created. In January we reported the above anomaly in Physical Review Letters, but at first, few took notice. That changed in April with a paper by Jonathan Feng, a theoretical particle physicist, who presented their work with the title of: "Evidence for a Protophobic Fifth Force from ^8Be Nuclear Transitions", which was followed by an article in Nature with a title of: "Has a Hungarian physics lab found a fifth force of nature?" Such an article produced a boom in the media. The proposed boson has become lunch-table talk in physics departments far and wide, and plans are afoot for testing the idea. If the particle is confirmed, that would completely upend our understanding of the universe. I am going to show the reliability of the data, place such a particle into context with other experimental results and discuss the implications of the results.