

## **Seminar Odjela za fiziku**

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### **The magnetic properties of the muon: a window on new physics beyond the Standard Model.**

*Prof. Giovanni Cantatore*

*University of Trieste*

*Physics Department*

#### **Abstract**

The "Muon g-2" experiment now running at Fermilab (Chicago, USA) has recently announced a new measurement of the gyromagnetic anomaly of the muon, obtained with unprecedented precision. It presents fresh evidence of the existence of novel physical phenomena not included in the Standard Model, the reference theory on the subatomic world. The latest experimental results by Muon g-2 show a discrepancy with respect to Standard Model based calculations at the level of 3.3 standard deviations ( $\sigma$ ). This measurement is compatible with a previous experiment, and the combination brings the statistical significance of the discrepancy to 4.2  $\sigma$ , just short of the customary 5  $\sigma$  required to claim a discovery.

One European leg of the collaboration, led by INFN, has contributed to Muon g-2 since the beginning by, among other things, designing and building a sophisticated laser calibration system for the calorimeters, which represents a state of the art device surpassing systems previously in use. This device has been a key ingredient of the fantastic precision achieved by Muon g-2. After a brief introduction to the experiment and to the relevance of the result, we will discuss in greater detail the laser calibration system and its importance.