



Contribution ID: 121

Type: **EPS Invited Speaker**

Clustering of light nuclei and electron screening in astrophysical environments (EPS Invited Speaker)

Thursday, 22 June 2017 11:30 (15 minutes)

Accurate measurements of nuclear reactions of astrophysical interest within, or close to, the Gamow peak show evidence of an unexpected effect attributed to the presence of atomic electrons in the target. The experiments need to include an effective “screening” potential to explain the enhancement of the cross sections at the lowest measurable energies. Despite various theoretical studies conducted over the past 20 years and numerous experimental measurements, a theory has not yet been found that can explain the cause of the exceedingly high values of the screening potential needed to explain the data. In this talk I will show that instead of an atomic physics solution of the “electron screening puzzle”, the reason for the large screening potential values is in fact due to clusterization effects in nuclear reactions, in particular for reaction involving light nuclei.

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Session Classification: Special session: celebrating Claudio Spitaleri

Track Classification: Special session on Claudio Spitaleri achievements