

Impact of quenching factor models on tests of DAMA

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For nearly two decades the DAMA Collaboration has been observing a modulating signal compatible with that expected from a dark matter presence in our galaxy. However, interpretations of this with the standard assumptions for dark matter particles are strongly ruled out by a large number of other experiments. This tension can be relaxed somewhat by making more tailored choices for the dark matter model and properties of interest, but expanding the models of interest in such a way makes it impossible to test the DAMA modulation conclusively. In order to understand the exact nature of this signal, we need to use a detector based on the same target (NaI(Tl)), which would be sensitive to exactly the same particle interaction models as DAMA.

There are a number of such experiments in the data taking or commissioning stages designed to do just this, two of which (ANAIS and COSINE) recently released their results after 3 years of data taking. Interestingly, the modulation observed by the two experiments deviate from each other by 2% , while being within 3% of the DAMA result. This talk addresses potential differences between NaI(Tl) based detectors that could lead to the differing results to date, with a particular focus on the quenching factor.

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