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Detailed R-matrix analysis of 7Li(p,g)aa at 441keV

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Light nuclei has received new interest with the advent of ab-initio calculations.
In order to test these calculations we need detailed experimental knowledge for comparison.
A prime test candidate is 8Be as it has both a-cluster and single particle states that interfere.

The 8Be system can be populated using the 7Li(p,g)8Be reaction which has a resonance with a branching ration of ˜1‰ at 441keV.
8Be subsequently breaks up into two alpha particles.
This reaction was studied previously using gamma detectors, for the high energy lines to the ground state and first excited state,
and a magnetic spectrometer for the 2+ states at 16.6 and 16.9MeV.
However, these experiments did not take interference into account.

We have measured the 8Be excitation spectrum from 1MeV to 17MeV using a compact silicon array.
Compared to gamma detectors this provides a clean spectrum with high resolution and acceptance.
The extracted excitation spectrum was then analysed with a multi level multi channel R-matrix code
giving a complete description of the 8Be spectrum below 17MeV.

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