Nickel-78 confirmed to be doubly magic
8 November 2017, by Bob Yirka

In the first approach, the team led by Olivier used a knockout reaction to eject a proton from a zinc-80 projectile, resulting in a copper-79 nucleus. They then used shell model calculations to show that copper-79 could be characterized as a doubly magic nickel-78 nucleus with an added proton. In the second approach, the team measured the mass of the copper isotopes in a chain from copper-75 to 79 using technology at CERN. They used what they found to show that copper-79 can be characterized as an individual proton sitting atop a doubly magic nickel-78 core.

While the methods used by the second team were quite different, the results were in agreement—nickel-78 is, indeed, doubly magic. This is not the end of the story, however, because both studies involved indirect approaches. Thus, nickel-78 will not be considered proven as doubly magic until it can be shown directly. To do that, some future research team will need to produce it in a lab in a way that allows for direct testing.


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