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Stranger Things - Physics at the femtometer scale

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The world around us consists of protons and neutrons –tightly bound quark systems that just like other hadrons are confined by the strong interaction. The processes occur at distances corresponding to a femtometer, i.e. 10-15 m, and generates almost 99% of the visible mass of the Universe. To describe these interactions quantitatively, belong to the most challenging problems in contemporary physics. Hyperons –quark triplets just like the protons but containing at least one heavier strange or charm quark –can shed new light on this puzzle. Being unstable, hyperons reveal through their decays more about their inner properties than protons. In particular, the hyperon spin can be traced in weak, parity violating decays. This feature makes hyperons a powerful diagnostic tool. In this talk, I will demonstrate how spin polarised and quantum entangled strange hyperons can be exploited to measure their structure and size at the femtometer scale. I will present recent progress from ongoing experiment and discuss future opportunities offered by facilities world-wide. Finally, I will share some personal refections on my career path as a woman in physics and provide some tips for the next generation.

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