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# Press Release

## Explaining the proton's spin

**Particle physicists from Tübingen and Buenos Aires show gluons may be providers of most of the spin in key building-block of matter**

Tübingen, 15 August 2014

Physicists long believed that protons were spun by their constituent quarks alone – until a 1987 experiment at the CERN laboratories in Switzerland showed that quarks were responsible for only about a quarter of proton spin. The ensuing “spin crisis” in particle physics may soon be ended in the wake of calculations by researchers from the University of Tübingen and the Universidad de Buenos Aires, Argentina – suggesting that other particles, gluons, may be the main driving force behind the proton's spin.

Dr. Marco Stratmann and Professor Werner Vogelsang of the Tübingen Institute for Theoretical Physics and their Argentine colleagues Professor Daniel de Florian and Professor Rodolfo Sassot base their study on experimental data from the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory in the US. The researchers studied data collected there and compared it with their theoretical model predicting the spin direction of gluons providing part of the momentum involved in proton collisions. Their results have now been published in Physical Review Letters (no. 113, p. 012001 (2014)).

“Although further data and analyses will be needed to understand the cause of the spin in detail and to reduce the experimental and theoretical uncertainties, this result is an important step forward,” says Marco Stratmann. “After more than 25 years, an end to the spin crisis may be in sight, and we will be able to understand the proton – which is fundamentally important for the structure of all matter – a little bit better.”

### Publication:

<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.113.012001>

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