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Abstract for an Invited Paper
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Tom W. Bonner Prize in Nuclear Physics (2021): The Fundamental Properties of the Neutron, or, Why Do We Keep Measuring the Same Things, Over and Over, Again¹
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The fundamental properties of elementary particles, such as their masses, lifetimes, and magnetic moments are key parameters in many physical models and their precise values can be used to benchmark fundamental theories. As a result, it seems clear that continued improvement in the accuracy of their determinations is a worthwhile endeavor. Nonetheless it is fair to question the value of seeking improved accuracy simply “for its own sake.” In this talk, I will review the history of a few fundamental properties of the neutron and show how their experimental determinations have impacted theory, sometimes in unexpected ways. I will also briefly discuss the estimation of experimental uncertainty with particular attention to the disconcertingly large number of “high sigma” discrepancies that occur among different measurements.

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