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Abstract for an Invited Paper  
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**Observation of long range Rydberg blockade<sup>1</sup>**

MARK SAFFMAN, University of Wisconsin

Interactions between Rydberg states of neutral atoms are a promising approach for fast and long range quantum gates. We demonstrate that a single Rydberg excited Rb atom blocks excitation of a second atom located more than  $10 \mu\text{m}$  away. The observed probability of double excitation of  $< 20 \%$  is consistent with a theoretical model of the Rydberg interaction. Progress towards using blockade to demonstrate a CNOT gate as well as ideas for efficient creation of multiqubit entanglement will be presented.

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