

Abstract Submitted  
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**Dipolar switching for robust quantum computation with polar molecules** SUSANNE YELIN, University of Connecticut, KATE KIRBY, Harvard/Smithsonian CfA, ROBIN COTE, University of Connecticut — We propose to use a new platform – ultracold polar molecules – for quantum computing with switchable interactions. The on/off switch is accomplished by selective excitation of one of the “0” or “1” qubits – long-lived molecular states – to an “excited” molecular state with a considerably different dipole moment. We describe various schemes based on this switching of dipolar interactions where the selective excitation between ground and excited states is accomplished via optical, micro-wave, or electric fields. We also generalized the schemes to take advantage of the *dipole blockade* mechanism when dipolar interactions are very strong. These schemes can be realized in several recently proposed architectures.

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