Contribution ID: **198** Type: **Talk**

# Calculation of disconnected contributions to nucleon form factors using hierarchical probing

*Tuesday, 24 June 2014 16:30 (20 minutes)*

We present results for the disconnected contributions to light-quark nucleon form factors and generalized form factors at a pion mass of approximately 300 MeV. The calculations are performed with clover fermions in a large volume, and the disconnected quark loops are evaluated using the hierarchical probing method. We compare the behavior of hierarchical probing with the traditional noise method for a wide range of observables. A large reduction of variance is observed for the electromagnetic form factors. For these form factors, we are able to clearly resolve nonzero disconnected light-quark contributions for the first time. We find that the ratio of disconnected to connected contributions to the proton electromagnetic form factors is of order 0.5%.

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**Session Classification:** Hadron Structure