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## From Quanta to the Continuum: Opportunities for Mesoscale Science

Mesoscale science embraces the regime where atomic granularity and quantization of energy yield to continuous matter and energy, where new levels of complexity and functionality emerge from simpler components, and where disparate degrees of freedom interact to produce entirely new behavior. Mesoscale science builds on the ever-growing foundation of nanoscale tools arid insights that the community has developed over the last decade and continues to develop. Mesoscale phenomena offer a new scientific opportunity: discovering and designing architectures and interactions from the bottom up to create new macroscopic behavior and functionality. Examples of mesoscale successes, challenges and opportunities will be described. A more complete discussion of mesoscale science can be found in the BESAC report, From Quanta to the Continuum: Opportunities for Mesoscale Science, http://science.energy.gov /bes/news-andresources/reports/basic-research-needs/ Innovative community input on opportunities for mesoscale science can be found on the Mesoscopic Materials and Chemistry website, http://www.mes02012.com/

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