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Embodied action of small groups answering the Quantum Mechanics Survey AURELIANO PEREZ, MARTIN LAWLER, HUNTER CLOSE, Texas State University — The Quantum Mechanics Survey (QMS) is a research-based assessment of student understanding of quantum mechanics in one dimension [1]. In a first upper-division course in quantum mechanics, we observed students working in isolated small groups to answer the QMS. Students in this class were instructed in an interactive lecture environment in which spatial visualization and gesture were encouraged. An understanding of the complex relative phase factor between components of a state is useful for some items on the QMS, and was meant to be enabled by the instructional use of posable pipe cleaners, which provide access to an “out-of-the-board” component for graphing the imaginary part of wave functions. Previous studies [2] have shown that students can make substantive use of their bodies and material surroundings to think spatially about the mathematics of quantum mechanics. In this talk we present an overview, with some examples, of students’ spontaneous use of gesture and other embodied action as a means for spatial thinking during their engagement with the QMS.

[1] G. Zhu & C. Singh, *Am. J. Phys.* 80(3), 252-259 (2012).

[2] H. Close, C. Schiber, E. Close, and D. Donnelly, presented at the Physics Education Research Conference 2013, Portland, OR, 2013.

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