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Pulling gold nanowires with a hydrogen clamp SZABOLCS CSONKA, Budapest University of Technology and Economics, ANDRAS HALBRITTER, GEORGE MIHALY, ELECTRON TRANSPORT RESEARCH GROUP OF THE HUNGARIAN ACADEMY OF SCIENCES AND DEPARTMENT OF PHYSICS TEAM — Gold nanojunctions were found to be perfect candidates for studying the quantum nature of the conductance. It was shown that monoatomic gold contacts have a single conductance channel with perfect transmission. During the elongation of a single-atom gold contact stable atomic chain can be formed [2]. We have performed an experimentally study of the interaction of gold nanowires with hydrogen molecules by the Mechanically Controllable Break Junction technique [1]. Our results show, that in hydrogen environment the conductance of the chain is strongly reduced compared to the perfect transmission of pure Au chains. The comparison of the experiments with recent theoretical prediction for the hydrogen welding of Au nanowires [3] implies that a hydrogen molecule can even be incorporated in the gold nanocontact, and this hydrogen clamp is strong enough to pull a chain of gold atoms. [1] Csonka et al., to be published in Phys. Rev. B, cond-mat/0502421 (2005). [2] Agrait et al., Phys. Rep. **377**, 81 (2003). [3] Barnett, Nano Letters **4**, 1845 (2004).

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