Meeting: 1005, Newark, Delaware, SS 5A, Special Session on Designs, Codes, and Geometries

1005-05-116 **Ka Hin Leung*** (matlkh@nus.edu.sg), Department of Mathematics, National University of Singapore, 2 Science Drive 2, 117543 Singapore, Singapore, **Siu Lun Ma** (matmasl@nus.edu.sg), Department of Mathematics, National Univesity of Singapore, 117543 Singapore, and **Bernhard Schmidt** (schmidt@math.uni-augsburg.de), Institut fur Mathematik Universit at Augsburg, 86135 Augsburg, Germany. *New Hadamard Matrices of Order $4p^2$ obtained from Jacobi Sums of Order 16.*

Let $p \equiv 7 \bmod 16$ be a prime. Then there are integers a, b, c, d with $a \equiv 15 \bmod 16$, $b \equiv 0 \bmod 4$, $p^2 = a^2 + 2(b^2 + c^2 + d^2)$, and $2ab = c^2 - 2cd - d^2$. We show that there is a regular Hadamard matrix of order $4p^2$ provided that $p = a \pm 2b$ or $p = a + \delta_1 b + 4\delta_2 c + 4\delta_1\delta_2 d$ with $\delta_i = \pm 1$. (Received February 02, 2005)