**ICM 1998, Berlin, Aug. 18–27**

**Abstracts of Short Communications and Posters**

**Section:**

**3. Number Theory and Arithmetic Algebraic Geometry**

1991 MS Classification: 11R18, 11R29, 11B68
Kimura, Noriaki, College of Industrial Technology, Nihon University
**A simple Proof of Carlitz's congruence of Vandiver Type**
Let $p$ be an odd prime, $\mathbf{Q}$ the rational number field. And let $\zeta_p$ be the $p$th root of unity. Let $p-1=ab$, where $b$ is odd $>1$. Let $K$ be the imaginary cyclic subfield of $\mathbf{Q}(\zeta_p)$ of degree $a$. For any integer $n \geq 1$, Carlitz has proved the following congruence of Vandiver Type.

$$h^{-}(K) \equiv (-1)^{\frac{a}{2}} 2^{-\frac{a-2}{2}} \prod_{\substack{s=1 \\ s:\mathrm{odd}}}^{a-1} B_{bsp^n+1} \pmod{p^n},$$

where $B_{bsp^n+1}$ are Bernoulli numbers. The simplest proof of this congruence will be presented. Also the similar congruence will be considered in case $K$ is an imaginary subfield of $\mathbf{Q}(\zeta_{p^\rho})$ $(\rho \geq 2)$.
References: H. S. Vandiver, On the first factor of the class number of a cyclotomic field, *Bull. Amer. Math. Soc.*$\mathbf{25}$, 1919, 458–461. L. Carlitz, The first factor of the class number of a cyclic field, *Canad. J. Math.*$\mathbf{6}$, 1954, 23–26. I. Sh. Slavutsky, The simplest proof of Vandiver's theorem, *Acta Arith.*$\mathbf{15}$, 1969, 117–118.