1025-20-154 **Koen J R Thas*** (kthas@cage.UGent.be), Dept. of Pure Mathematics & Computer Algebra, Krijgslaan 281, S22, 9000 Ghent, Belgium. *The p-modular cohomology algebra of finite p-groups, Pauli operators and symplectic forms.*

For a finite p-group P, let

$$H^*(P) = H^*(P, \mathbb{F}_p) = \bigoplus_{i=0}^{\infty} H^i(P, \mathbb{F}_p)$$

be the p-modular cohomology algebra of P.

A theorem of J.-P. Serre states that if P is a p-group which is not elementary abelian, then there exist non-zero elements $u_1, u_2, \ldots, u_m \in H^1(P, \mathbb{F}_p)$ such that

$$(*) \qquad \prod_{i=1}^{m} u_i = 0 \ \text{ if } p = 2 \text{ and } \prod_{i=1}^{m} \beta(u_i) = 0 \ \text{ if } p > 2,$$

where β is the Bockstein homomorphism. The smallest integer m such that relation (*) is satisfied is referred to as the *cohomology length* of P, and is usually denoted by **chl**(P).

Secondly, M. Saniga and M. Planat recently formulated a conjecture on the geometric structure of complex general Pauli operators of N-qubit Hilbert spaces. A positive answer would have many implications in the field of Quantum Physics.

In my lecture, I want to show how one can see these questions from a symplectic bridge, and elaborate on their solutions. (Received January 22, 2007)