1054-16-48 **Yevgenia Kashina**, DePaul University, **M. Susan Montgomery***, University of Southern California, and **Siu-hung Richard Ng**, Iowa State University. *Frobenius-Schur indicators of representations of Hopf algebras and the trace of the antipode.*

We connect properties of the trace of the anitpode S of a Hopf algebra H to the Frobenius-Schur indicators of its irreducible representations.

First assume that H is a finite-dimensional semisimple Hopf algebra over $\mathbb{C}$. Then $S^2 = id$, and so $Tr(S)$ is an integer. We ask when in fact $\mathrm{Tr}(S) > 0$. This is true if H is a bismash product constructed from a matched pair of groups, but if cocycles are present, it is possible for $Tr(S) < 0$. We show that $Tr(S) \geq 0$ in some other cases, such as when H is modular, for example if H is factorizable.

We apply some of these results to prove a Hopf analog of a main preliminary step in the Brauer-Fowler theorem for finite groups. That is, if $\dim(H)$ is even, we prove there is some self-dual irreduclble representation V of H such that

$$dim(V) \leq \frac{n-1}{|Tr(S)-1|}.$$

Moreover if $Tr(S) > 1$ then $\nu_2(V) = 1$, and if $Tr(S) < 1$ then $\nu_2(V) = -1$ (necessarily $Tr(S) \neq 1$ if $dim(H)$ is even). Here $\nu_2(V)$ denotes the Frobenius-Schur indicator of V; $\nu_2(V) = 1$ (resp. -1) when V admits a non-degeenrate H-invariant symmetric (resp skew) bilinear form. (Received August 27, 2009)