1074-20-197 **Kenneth W Johnson*** (kwj1@psu.edu). 2-*S-rings of groups and generalizations.* Preliminary report.

The S-ring arising from the orbits of an action of a permutation group $M$ on a finite group $G$ is familiar, the most basic example being the S-ring of conjugacy classes of a group which gave rise to Frobenius' first definition of group character theory. The orbits of $G \times \mathcal{S}_k$ acting on $k$-tuples of elements of $G$, with an element $g \in G$ acting by simultaneous conjugation and an element $\sigma$ in the symmetric group $\mathcal{S}_k$ acting by

$$\sigma(g_1, g_2, ..., g_k) = (g_{\sigma(1)}, g_{\sigma(2)}, ..., g_{\sigma(k)}),$$

arise naturally in the theory of higher characters.

For the case $k = 2$ Humphries and his students have studied the 2-*S-ring* of a group. Explicitly this consists of the subalgebra of $\mathbb{Z}(G \times G)$ which is generated by the element sums of the orbits described above. It is not necessarily commutative. They have proved that if groups $G_1$ and $G_2$ have the same irreducible 2-characters and isomorphic 2-S-rings then $G_1$ and $G_2$ have the same derived length. I will discuss how there are more general coherent configurations which arise, and also conditions for which the symmetrization of such coherent configurations are association schemes. (Received August 21, 2011)