1067-20-1546 **Luise-Charlotte Kappe*** (`menger@math.binghamton.edu`), Department of Mathematical Sciences, Binghamton, NY 13902-6000. *Nonabelian tensor products: the mystery of compatible actions.* Preliminary report.

Let G and H be groups acting on each other and acting on themselves by conjugation, where ${}^{g}g' = gg'g^{-1}$ and ${}^{h}h' = hh'h^{-1}$ for $g, g' \in G$ and $h, h' \in H$. We say the mutual actions are compatible if

$$^{({}^{g}h)}g' = {}^{g}({}^{h}({}^{g^{-1}}g')) \quad \text{and} \quad ^{({}^{h}g)}h' = {}^{h}({}^{g}({}^{h^{-1}}h'))$$

for all $g, g' \in G$ and $h, h' \in H$.

Compatible actions play a role in the nonabelian tensor product defined as follows.

Let G and H be groups which act on each other in a compatible fashion. Then the nonabelian tensor product $G \otimes H$ is the group generated by $g \otimes h$ for $g \in G$ and $h \in H$ with relations

$$gg' \otimes h = ({}^{g}g' \otimes {}^{g}h)(g \otimes h)$$
$$g \otimes hh' = (g \otimes h)({}^{h}g \otimes {}^{h}h').$$

The topic of this talk is to shed some light on the mystery of compatible actions. We will give a brief overview on what is known so far, provide some new results in case of cyclic groups, and discuss various approaches on how to unravel this mystery further. (Received September 21, 2010)