Meeting of Thursday December 12, 2013

December-12-13 3:59 AM

Enriquez: $\mathfrak{g}, \mathfrak{g}^* \subset \mathfrak{d}$ $\quad \mathcal{D}: U(\mathfrak{d})\text{-mod}, \quad \mathcal{D}^{\Phi}: U(\mathfrak{d})\text{-Mod}^{\Phi}$

$M = U(\mathfrak{d})/U(\mathfrak{d})\mathfrak{g}^*$ co-cocommutative & co-associative in both $\mathcal{D}$ & $\mathcal{D}^{\Phi}$

$F: \mathcal{D} \to \text{Vect} \qquad F(X) = X_{\mathfrak{g}} = X/\mathfrak{g}X$

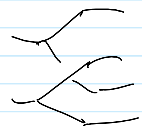
$F(X \otimes Y) \to F(X) \otimes F(Y)$ "obvious"

F takes M to $F(M)$, which is also co-commutative and co-associative.

$$\begin{tikzcd}
& F(XY)F(Z) \arrow[r] & (F(X)F(Y))F(Z) \arrow[d, dash] \\
F((XY)Z) \arrow[ur, dash] \arrow[d, dash] & \circlearrowright & F(X)(F(Y)F(Z)) \\
F(X(YZ)) \arrow[r, dash] & F(X)F(YZ) \arrow[ur, dash] &
\end{tikzcd}
\quad \& \quad
\begin{tikzcd}
F(XY) \arrow[r, dash] \arrow[d, dash] \arrow[dr, phantom, "\circlearrowleft"] & F(X)F(Y) \arrow[d, dash] \\
F(YX) \arrow[r, dash] & F(Y)F(X)
\end{tikzcd}$$

$M \otimes M$ is a a co-algebra, non-co-commutative, by

$U_\hbar(\mathfrak{g}) = F(M \otimes M)$



$$\begin{tikzcd}
F(M^2) \otimes F(M^2) & F(M^2 M^2) \arrow[l] & F(M^3) \arrow[l, "F(\Delta 1)"'] \arrow[r, "F(1\epsilon 1)"] \arrow[ll, bend left, "\text{iso}"] & F(MM)
\end{tikzcd}$$

Associativity follows from a big diagram