Dear Joan,

Thanks to some considerable help from the Kazhdan-Lusztig paper (which is terribly relevant to the whole business) I managed to put together the representation of $B_6$ which passes to mapping class gp. of sphere - 6 points - in a nice form for calculation. You'll recognize lots of Burau rep. everywhere - this is as it should be.

So to calculate the trace polynomial (one variable) for a 6-plat, just look at the product of two braids word in those generators, evaluate $e_1 e_2 e_5 \cdot e_3$ Note that $e_1 e_5$ is the matrix

\[
\begin{pmatrix}
    0 & 1 & 0 & 0 & 0 & 0 \\
    -1 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & 1 & 0 & 0 & 0 \\
    0 & 0 & 0 & 1 & 0 & 0 \\
    0 & 0 & 0 & 0 & 1 & 0 \\
    0 & 0 & 0 & 0 & 0 & 1
\end{pmatrix}
\]

so this part is trivial.

In fact getting no $2\pi j$ seems interesting - it's not clear that Kazhdan & Lusztig knew this sort of thing. Putting $t=-1$ is interesting the Lie algebra generated
by $1 + g_1, \ldots, 1 + g_5$ when $t = 1$ should be
worth looking at.

Have fun with the matrices - this is as good
as they can be.

All the best,

Vaughan