

$$N = 145 = 5 \cdot 29$$

By the Ibukiyama-Kitayama dimension formula,
 $\dim(S_4(K(145))) = 57$

By the Skoruppa-Zagier dimension formula and Jacobi restriction,
the lift dimension of $S_4(K(145))^+$ is 26
the nonlift dimension of $S_4(K(145))^+$ is heuristically 30
 $\dim(S_4(K(145))^+)$ thus is heuristically 56
 $\dim(S_4(K(145))^-)$ is heuristically 1

The heuristic dimensions are correct by the spanning results to follow

$\dim(J_{\{2,145\}}^{\{\text{cusp}\}}) = 3$ (Skoruppa-Zagier), so need to span to within 2 dimensions

$q = 7$ for TraceDown

After TD($\text{Grit}(J_{\{4,1015\}}^{\{\text{cusp}\}})$) and $(\text{Grit}(J_{\{2,145\}}^{\{\text{cusp}\}}))^2$,
spanned rank in $S_4(K(145))^+$ is 56
spanned rank in $S_4(K(145))^-$ is 0

After Borcherds products,
spanned rank in $S_4(K(145))^-$ is 1

Final spanned rank in $S_4(K(145))^+$ is 56

Final spanned rank in $S_4(K(145))^-$ is 1

 $S_2(K(145))$ is determined by Jacobi restriction and the $H4Ndd(2,+)$ test
($H_4(145,2,2)^+ = 0$)

So $S_2(K(145)) = \text{Grit}(J_{\{2,145\}}^{\{\text{cusp}\}})$ (dimension 3)