

$$N = 154 = 2 \cdot 7 \cdot 11$$

By the Ibukiyama-Kitayama dimension formula,
 $\dim(S_4(K(154))) = 58$

By the Skoruppa-Zagier dimension formula and Jacobi restriction,
the lift dimension of $S_4(K(154))^+$ is 25
the nonlift dimension of $S_4(K(154))^+$ is heuristically 30
 $\dim(S_4(K(154))^+)$ thus is heuristically 55
 $\dim(S_4(K(154))^-)$ is heuristically 3

The heuristic dimensions are correct by the spanning results to follow

$\dim(J_{\{2,154\}}^{\{\text{cusp}\}}) = 2$ (Skoruppa-Zagier), so need to span to within 1 dimension

$q = 3$ for TraceDown

After TD($\text{Grit}(J_{\{4,462\}}^{\{\text{cusp}\}})$) and $(\text{Grit}(J_{\{2,154\}}^{\{\text{cusp}\}}))^2$,
spanned rank in $S_4(K(154))^+$ is 43
spanned rank in $S_4(K(154))^-$ is 0

Hecke operators applied: $\{\{2, 2\}, \{2, 2\}, \{2, 1\}\}$

After Hecke spreading,
spanned rank in $S_4(K(154))^-$ is 2

After Borcherds products,
spanned rank in $S_4(K(154))^+$ is 55
spanned rank in $S_4(K(154))^-$ is 3

Final spanned rank in $S_4(K(154))^+$ is 55

Final spanned rank in $S_4(K(154))^-$ is 3

 $S_2(K(154))$ is determined by Jacobi restriction and the $H_4\text{Ndd}(2,+)$ test
($H_4(154,2,2)^+ = 0$)

So $S_2(K(154)) = \text{Grit}(J_{\{2,154\}}^{\{\text{cusp}\}})$ (dimension 2)