M_{24} in characteristic 2

- FM_{24} has only one block, i.e. the principal one of defect 10.
- $P \in \mathrm{Syl}_2(M_{24})$; $N_{M_{24}}(P) = P$
- $P \geq Q \in \mathrm{Syl}_2(K)$ where K denotes he commutator subgroup of the maximal subgroup $2^6\!:\!(L_3(2) \times \mathfrak{S}_3)$ of M_{24} of index 3795.
- $N_{M_{24}}(Q)$ has order 3072, and $N_{M_{24}}(Q)/Q \cong \mathfrak{S}_3$; the trivial $FN_{M_{24}}(Q)$-module is denoted by 1, and the inflation of the two-dimensional projective simple $F[N_{M_{24}}(Q)/Q]$-module is denoted by 2.
- The simple FM_{24}-module $D(1792)_{24}$ has vertex Q. The remaining simple FM_{24}-modules have vertex P. The Loewy structures of their Green correspondents and sources are as follows:

module	$D(1)_{24}$	$D(11)_{24}$	$D(11)_{24}^*$	$D(44)_{24}$	$D(44)_{24}^*$
Green	1	11	11	44	44
layer dims.	1	$1, 1, 2, 2, 2, 1, 1, 1$	$1, 1, 1, 2, 2, 2, 1, 1$	$1, 2, 4, 4, 6, 6, 6, 5, 5, 3, 1, 1$	$2, 2, 3, 4, 4, 6, 6, 6, 4, 4, 2, 1$

module	$D(120)_{24}$	$D(220)_{24}$	$D(220)_{24}^*$
Green	120	220	220
layer dims.	$2, 4, 6, 9, 10, 14, 14, 14, 13, 12, 9, 6, 4, 2, 1$	$1, 3, 6, 10, 14, 20, 23, 26, 26, 25, 21, 18, 12, 8, 4, 2, 1$	$2, 4, 7, 11, 14, 18, 22, 24, 24, 23, 21, 17, 14, 9, 6, 3, 1$

module	$D(252)_{24}$	$D(320)_{24}$	$D(320)_{24}^*$	$D(1242)_{24}$
Green	252	320	320	218
layer dims.	$3, 5, 7, 13, 17, 22, 25, 29, 28, 27, 23, 20, 14, 9, 6, 3, 1$	$1, 3, 6, 11, 17, 23, 29, 34, 36, 36, 34, 29, 23, 17, 11, 6, 3, 1$	$1, 3, 6, 11, 17, 23, 29, 34, 36, 36, 34, 29, 23, 17, 11, 6, 3, 1$	$3, 6, 9, 14, 17, 21, 23, 25, 23, 22, 18, 14, 10, 7, 3, 2, 1$

The Green correspondent of $D(1792)_{24}$ in $N_{M_{24}}(Q)$ has dimension 256 and Loewy series:

layer	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
multiplicity of 1	0	1	4	8	11	11	8	5	5	8	11	11	8	4	1	0
multiplicity of 2	1	2	2	3	4	6	10	13	13	10	6	3	2	2	2	1

Moreover, $D(1792)_{24}$ has sources of dimension 128, and the dimensions of their Loewy layers are $1, 3, 5, 9, 13, 15, 18, 18, 15, 13, 9, 5, 3, 1$.

- standard generators of M_{24}:
  $a := (1,13)(2,20)(3,8)(4,17)(5,14)(6,7)(9,22)(10,18)(11,19)(12,23)(15,24)(16,21)$, $b := (2,13,10)(3,4,14)(5,7,18)(6,19,15)(9,11,22)(17,21,23)$
- representative for conjugacy class $7A$: $(ababababbabbababababbabb)^3$
- representative for conjugacy class $15A$: $ababababab b$

module	conj. class	modular char. value	Brauer char.
$D(11)_{24}$	$7A$	$0 = \overline{-b7}$	φ_2
$D(44)^*_{24}$	$7A$	$1 = \overline{-1+b7}$	φ_4
$D(220)^*_{24}$	$7A$	$0 = \overline{b7}$	φ_7
$D(320)^*_{24}$	$15A$	$0 = \overline{-1+b15}$	φ_{10}

Hence:

$D(1)_{24} = F \leftrightarrow \varphi_1$, $D(11)_{24} \leftrightarrow \varphi_2$, $D(11)^*_{24} \leftrightarrow \varphi_3$, $D(44)_{24} \leftrightarrow \varphi_5$, $D(44)^*_{24} \leftrightarrow \varphi_4$, $D(120)_{24} \leftrightarrow \varphi_6$, $D(220)_{24} \leftrightarrow \varphi_8$, $D(220)^*_{24} \leftrightarrow \varphi_7$, $D(252)_{24} \leftrightarrow \varphi_9$, $D(320)_{24} \leftrightarrow \varphi_{11}$, $D(320)^*_{24} \leftrightarrow \varphi_{10}$, $D(1242)_{24} \leftrightarrow \varphi_{12}$, $D(1792)_{24} \leftrightarrow \varphi_{13}$.