One hole: d9 sector

Each symbol denotes a block of states; U denotes int matrix

	$d^9_\uparrow$	$d^8_{\uparrow\downarrow}s_\uparrow$	$d^8_{\uparrow\uparrow}s_\downarrow$	$d^9_\downarrow$	$d^8_{\downarrow\downarrow}s_\uparrow$	$d^8_{\downarrow\uparrow}s_\downarrow$
$d^9_\uparrow$	ϵ_d	t_{ds}	t_{ds}	0	0	0
$d^8_{\uparrow\downarrow}s_\uparrow$		$2\epsilon_d$+U	U?	0	0?	0?
$d^8_{\uparrow\uparrow}s_\downarrow$			$2\epsilon_d$+U	0	0?	0?
$d^9_\downarrow$	Above red U matrix is only finite between two triplet d8 states: S=Sz=1? All 1A, 1B, 1E symmetry channels are zero?			ϵ_d	t_{ds}	t_{ds}
$d^8_{\downarrow\downarrow}s_\uparrow$					$2\epsilon_d$+U	U?
$d^8_{\downarrow\uparrow}s_\downarrow$						$2\epsilon_d$+U

One hole

The complete VS consists of $d^9_\uparrow$, $d^9_\downarrow$, $L_\uparrow$, $L_\downarrow$ sectors

To reduce VS, can consider only $d^9_\uparrow$ sector and skip $d^9_\downarrow$ (previous slide);
Similarly, only need keep $L_\uparrow$ sector because $L_\downarrow$ does not connect with neither $L_\uparrow$ nor $d^9_\uparrow$ sectors
So only 6 states below:

$$d^9_\uparrow \quad d^8_{\uparrow\downarrow}s_\uparrow \quad d^8_{\uparrow\uparrow}s_\downarrow \quad L_\uparrow \quad d^9_\downarrow L_\uparrow s_\uparrow \quad d^9_\uparrow L_\uparrow s_\downarrow$$

Two hole (only d9L sector leading to d8)

	$d^9_\uparrow L_\sigma$	$d^8_{\uparrow\downarrow} L_\sigma s_\uparrow$	$d^8_{\uparrow\uparrow} L_\sigma s_\downarrow$	$d^9_\downarrow L_\sigma$	$d^8_{\downarrow\downarrow} L_\sigma s_\uparrow$	$d^8_{\downarrow\uparrow} L_\sigma s_\downarrow$
$d^9_\uparrow L_\sigma$	$\epsilon_{d,p}$	t_{ds}	t_{ds}	0	0	0
$d^8_{\uparrow\downarrow} L_\sigma s_\uparrow$		$2\epsilon_d$+U	U?	0	0?	0?
$d^8_{\uparrow\uparrow} L_\sigma s_\downarrow$			$2\epsilon_d$+U	0	0?	0?
$d^9_\downarrow L_\sigma$	So above red U matrix is only finite between two triplet states: S=Sz=1? All 1A, 1B, 1E symmetry channels are zero?			$\epsilon_{d,p}$	t_{ds}	t_{ds}
$d^8_{\downarrow\downarrow} L_\sigma s_\uparrow$					$2\epsilon_d$+U	U?
$d^8_{\downarrow\uparrow} L_\sigma s_\downarrow$						$2\epsilon_d$+U

Two hole

The complete VS consists of $d^8_{\sigma\sigma'}$ $d^9_\sigma L_{\sigma'}$ $d^{10} L_{\sigma\sigma'}$ sectors

To reduce VS, can consider only $d^9_\uparrow L_\sigma$ sector and skip $d^9_\downarrow L_\sigma$;

Hence, only need to keep $d^8_{\uparrow\sigma}$ and $d^{10} L_{\uparrow\sigma}$ sectors

connecting with $d^9_\uparrow L_\sigma$;

So reduced VS has only states below:

$$d^9_\uparrow L_\sigma \qquad d^8_{\uparrow\downarrow} L_\sigma s_\uparrow \qquad d^8_{\uparrow\uparrow} L_\sigma s_\downarrow$$

$$d^8_{\uparrow\sigma}$$

$$d^{10} L_{\uparrow\sigma} \qquad d^9_\downarrow L_{\uparrow\sigma} s_\uparrow \qquad d^9_\uparrow L_{\uparrow\sigma} s_\downarrow$$

Only need to consider $\sigma = \uparrow$?