Modified Scheme for $IJ^{P(C)}$

LHCb Scheme

case i: T states with zero S, C, and B

(a) superscript for I, P, and G
(b) subscript for J

$Z_c(3900)^+ \to \pi^+ J/\psi$
becomes
$T^b_{\psi 1}(3900)^+$

T states
zero net S, C, B

(P,G)	$I=0$	$I=1$
$(-,-)$	ω	π
$(-,+)$	η	ρ
$(+,+)$	f	b
$(+,-)$	h	a

case ii: T states with nonzero S, C, or B

(a) superscript for I and P
(b) subscript for J

$Z_{cs}(4000)^+ \to K^+ J/\psi$
becomes
$T^\theta_{\psi s 1}(4000)^+$

T states
non-zero net S, C, B

(P)	$I=0$	$I=\frac{1}{2}$	$I=1$
$(-)$	η	τ	π
$(+)$	f	θ	a

case iii: P states

(a) superscript for I
(b) J^P appended last

$P_c(4312)^+ \to pJ/\psi$
becomes
$P^N_\psi(4312)^+ J^P$

P states

$I=0$	$I=\frac{1}{2}$	$I=1$	$I=\frac{3}{2}$
Λ	N	Σ	Δ

Modified Scheme

all cases:

(a) superscript for $2I+1$
(b) $J^{P(C)}$ appended last

$Z_c(3900)^+ \to \pi^+ J/\psi$
becomes
$T^3_\psi(3900)^+ 1^{+-}$

$Z_{cs}(4000)^+ \to K^+ J/\psi$
becomes
$T^2_{\psi s}(4000)^+ 1^+$

$P_c(4312)^+ \to pJ/\psi$
becomes
$P^2_\psi(4312)^+ J^P$

$T/P\ {}^{2I+1}_{\text{quarks}}\ (\text{mass})^q\ J^{P(C)}$

Two More Possible Modifications

1. Replace the subscripts ψ and Υ with $c\bar{c}$ and $b\bar{b}$ for better symmetry in names.

   For example, replace T_{ψ} and T_{cc} with $T_{c\bar{c}}$ and T_{cc}.

2. Don't include $s\bar{s}$ content in the naming scheme.

   For example, don't change the name of the $f_0(980)$ molecule candidate, which includes $s\bar{s}$.

Daub, Hanhart, Kubis, JHEP 02 (2016), 009 [arXiv:1508.06841 [hep-ph]].