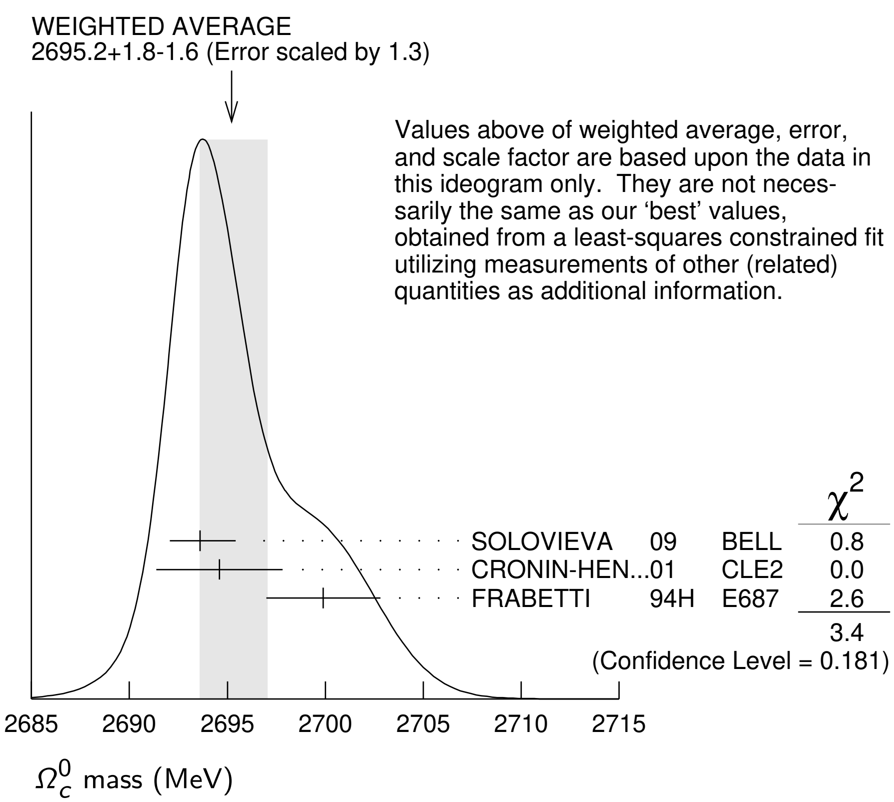
Ω_c^0

$I(J^P) = 0(\frac{1}{2}^+)$ Status: ∗∗∗

The quantum numbers have not been measured, but are simply assigned in accord with the quark model, in which the Ω_c^0 is the ssc ground state. No absolute branching fractions have been measured.

Ω_c^0 MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2695.2± 1.7 OUR FIT	Error includes scale factor of 1.3.				
$2695.2^{+1.8}_{-1.6}$ OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.				
$2693.6 \pm 0.3^{+1.8}_{-1.5}$	725	SOLOVIEVA	09	BELL	$\Omega^- \pi^+$ in $e^+ e^- \to \Upsilon(4S)$
$2694.6 \pm 2.6 \pm 1.9$	40	[1] CRONIN-HEN..	01	CLE2	$e^+ e^- \approx$ 10.6 GeV
$2699.9 \pm 1.5 \pm 2.5$	42	[2] FRABETTI	94H	E687	γ Be, $\overline{E}_\gamma$ = 221 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2705.9 \pm 3.3 \pm 2.0$	10	[3] FRABETTI	93	E687	γ Be, $\overline{E}_\gamma$ = 221 GeV
$2719.0 \pm 7.0 \pm 2.5$	11	[4] ALBRECHT	92H	ARG	$e^+ e^- \approx$ 10.6 GeV
2740 ± 20	3	BIAGI	85B	SPEC	Σ^- Be 135 GeV/c



[1] CRONIN-HENNESSY 01 sees 40.4 ± 9.0 events in a sum over five channels.

[2] FRABETTI 94H claims a signal of 42.5 ± 8.8 $\Sigma^+ K^- K^- \pi^+$ events. The background is about 24 events.

[3] FRABETTI 93 claims a signal of 10.3 ± 3.9 $\Omega^- \pi^+$ events above a background of 5.8 events.

[4] ALBRECHT 92H claims a signal of 11.5 ± 4.3 $\Xi^- K^- \pi^+ \pi^+$ events. The background is about 5 events.

Ω_c^0 MEAN LIFE

VALUE (10^{-15} s)	EVTS	DOCUMENT ID		TECN	COMMENT
268±24±10	978	[1] AAIJ	18J	LHCB	$p K^- K^- \pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$72 \pm 11 \pm 11$	64	LINK	03C	FOCS	$\Omega^- \pi^+$, $\Xi^- K^- \pi^+ \pi^+$
$55^{+13}_{-11}{}^{+18}_{-23}$	86	ADAMOVICH	95B	WA89	$\Omega^- \pi^- \pi^+ \pi^+$, $\Xi^- K^- \pi^+ \pi^+$
$86^{+27}_{-20} \pm 28$	25	FRABETTI	95D	E687	$\Sigma^+ K^- K^- \pi^+$

[1] AAIJ 18J, with nearly five times more events that the previous three experiments combined, gets a lifetime that is nearly four times larger than the average of those experiments, $(69 \pm 12) \times 10^{-15}$ s. We go with the larger data sample.

Ω_c^0 DECAY MODES

No absolute branching fractions have been measured. The following are branching *ratios* relative to $\Omega^- \pi^+$.

	Mode	Fraction (Γ_i/Γ)	Confidence level
	Cabibbo-favored ($S = -3$) decays — relative to $\Omega^- \pi^+$		
Γ_1	$\Omega^- \pi^+$	**DEFINED AS 1**	
Γ_2	$\Omega^- \pi^+ \pi^0$	1.80 ± 0.33	
Γ_3	$\Omega^- \rho^+$	>1.3	90%
Γ_4	$\Omega^- \pi^- 2\pi^+$	0.31 ± 0.05	
Γ_5	$\Omega^- e^+ \nu_e$	2.4 ± 1.2	
Γ_6	$\Xi^0 \overline{K}^0$	1.64 ± 0.29	
Γ_7	$\Xi^0 K^- \pi^+$	1.20 ± 0.18	
Γ_8	$\Xi^0 \overline{K}^{*0}$, $\overline{K}^{*0} \to K^- \pi^+$	0.68 ± 0.16	
Γ_9	$\Omega(2012)^- \pi^+$, $\Omega(2012)^- \to \Xi^0 K^-$	0.12 ± 0.05	
Γ_{10}	$\Xi^- \overline{K}^0 \pi^+$	2.12 ± 0.28	
Γ_{11}	$\Omega(2012)^- \pi^+$, $\Omega(2012)^- \to \Xi^- \overline{K}^0$	0.12 ± 0.06	
Γ_{12}	$\Xi^- K^- 2\pi^+$	0.63 ± 0.09	
Γ_{13}	$\Xi(1530)^0 K^- \pi^+$, $\Xi^{*0} \to \Xi^- \pi^+$	0.21 ± 0.06	
Γ_{14}	$\Xi^- \overline{K}^{*0} \pi^+$	0.34 ± 0.11	
Γ_{15}	$p K^- K^- \pi^+$	seen	
Γ_{16}	$\Sigma^+ K^- K^- \pi^+$	<0.32	90%
Γ_{17}	$\Lambda \overline{K}^0 \overline{K}^0$	1.72 ± 0.35	

Ω_c^0 BRANCHING RATIOS

A few early but now obsolete measurements have been omitted. See K.A. Olive, et al. (Particle Data Group), Chinese Physics **C38** 070001 (2014).

$\Gamma(\Omega^- \pi^+ \pi^0)/\Gamma(\Omega^- \pi^+)$ — Γ_2/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.80±0.33 OUR AVERAGE	Error includes scale factor of 1.9.				
2.00±0.17±0.11	403	YELTON	18	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$, +higher
1.27±0.31±0.11	64	AUBERT	07AH	BABR	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Omega^- \rho^+)/\Gamma(\Omega^- \pi^+ \pi^0)$ — Γ_3/Γ_2

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
>0.71	90	[1] YELTON	18	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$, +higher

[1] This submode fraction is evaluated from a background-subtracted signal in a mass plot. Result ignores interference effects and systematic uncertainties, which YELTON 18 claim are both small.

$\Gamma(\Omega^- \pi^- 2\pi^+)/\Gamma(\Omega^- \pi^+)$ — Γ_4/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.31±0.05 OUR AVERAGE					
0.32±0.05±0.02	108	YELTON	18	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$, +higher
0.28±0.09±0.01	25	AUBERT	07AH	BABR	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Omega^- \pi^+)/\Gamma(\Omega^- e^+ \nu_e)$ — Γ_1/Γ_5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.41±0.19±0.04	11	AMMAR	02	CLE2	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Xi^0 \overline{K}^0)/\Gamma(\Omega^- \pi^+)$ — Γ_6/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.64±0.26±0.12	98	YELTON	18	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$, +higher

$\Gamma(\Xi^0 K^- \pi^+)/\Gamma(\Omega^- \pi^+)$ — Γ_7/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.20±0.16±0.08	168	YELTON	18	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$, +higher

$\Gamma(\Xi^0 \overline{K}^{*0},\ \overline{K}^{*0} \rightarrow K^- \pi^+)/\Gamma(\Xi^0 K^- \pi^+)$ — Γ_8/Γ_7

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.57±0.10	95	[1] YELTON	18	BELL	$e^+ e^- \rightarrow \Upsilon(4S)$, +higher

[1] This submode fraction is evaluated from a background-subtracted signal in a mass plot. Result ignores interference effects and systematic uncertainties, which YELTON 18 claim are both small.

$\Gamma(\Omega(2012)^- \pi^+,\ \Omega(2012)^- \rightarrow \Xi^0 K^-)/\Gamma(\Xi^0 K^- \pi^+)$ — Γ_9/Γ_7

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
9.6±3.2±1.8	28	[1] LI	21D	BELL	$e^+ e^-$ at Υ(nS)

[1] LI 21D reports the significance of the $\Omega(2012)$ signal is 4.2 σ including systematic uncertainties. Also measures $B(\Omega_c^0 \rightarrow \Omega(2012)^- \pi^+,\ \Omega(2012)^- \rightarrow (\overline{K}\Xi)^-)/B(\Omega_c^0 \rightarrow \Xi^0 K^- \pi^+) = 0.220 \pm 0.059 \pm 0.035$.

$\Gamma(\Xi^- \overline{K}^0 \pi^+)/\Gamma(\Omega^- \pi^+)$ — Γ_{10}/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
2.12±0.24±0.14	349	YELTON	18	BELL	$e^+ e^- \to \Upsilon(4S)$, +higher

$\Gamma(\Omega(2012)^- \pi^+,\ \Omega(2012)^- \to \Xi^- \overline{K}^0)/\Gamma(\Xi^- \overline{K}^0 \pi^+)$ — Γ_{11}/Γ_{10}

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
5.5±2.8±0.7	18	[1] LI	21D	BELL	$e^+ e^-$ at Υ(nS)

[1] LI 21D reports the significance of the $\Omega(2012)$ signal is 4.2σ including systematic uncertainties. Also measures $B(\Omega_c^0 \to \Omega(2012)^- \pi^+,\ \Omega(2012)^- \to (\overline{K}\Xi)^-)/B(\Omega_c^0 \to \Xi^0 K^- \pi^+) = 0.220 \pm 0.059 \pm 0.035$.

$\Gamma(\Xi^- K^- 2\pi^+)/\Gamma(\Omega^- \pi^+)$ — Γ_{12}/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.63±0.09 OUR AVERAGE	Error includes scale factor of 1.4.				
0.68±0.07±0.03	278	YELTON	18	BELL	$e^+ e^- \to \Upsilon(4S)$, +higher
0.46±0.13±0.03	45	AUBERT	07AH	BABR	$e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\Xi(1530)^0 K^- \pi^+,\ \Xi^{*0} \to \Xi^- \pi^+)/\Gamma(\Xi^- K^- 2\pi^+)$ — Γ_{13}/Γ_{12}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.33±0.09	74	[1] YELTON	18	BELL	$e^+ e^- \to \Upsilon(4S)$, +higher

[1] This submode fraction is evaluated from a background-subtracted signal in a mass plot. Result ignores interference effects and systematic uncertainties, which YELTON 18 claim are both small.

$\Gamma(\Xi^- \overline{K}^{*0} \pi^+)/\Gamma(\Xi^- K^- 2\pi^+)$ — Γ_{14}/Γ_{12}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.55±0.16	136	[1] YELTON	18	BELL	$e^+ e^- \to \Upsilon(4S)$, +higher

[1] This submode fraction is evaluated from a background-subtracted signal in a mass plot. Result ignores interference effects and systematic uncertainties, which YELTON 18 claim are both small.

$\Gamma(p K^- K^- \pi^+)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	AAIJ	16O	LHCB	pp at 7, 8 TeV

$\Gamma(\Sigma^+ K^- K^- \pi^+)/\Gamma(\Omega^- \pi^+)$ — Γ_{16}/Γ_1

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<0.32	90	17	YELTON	18	BELL	$e^+ e^- \to \Upsilon(4S)$, +higher

$\Gamma(\Lambda \overline{K}^0 \overline{K}^0)/\Gamma(\Omega^- \pi^+)$ — Γ_{17}/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.72±0.32±0.14	95	YELTON	18	BELL	$e^+ e^- \to \Upsilon(4S)$, +higher

Ω_c^0 REFERENCES

LI	21D	PR D104 052005	Y.B. Li *et al.*	(BELLE Collab.)
AAIJ	18J	PRL 121 092003	R. Aaij *et al.*	(LHCb Collab.)
YELTON	18	PR D97 032001	J. Yelton *et al.*	(BELLE Collab.)
AAIJ	16O	PR D93 092007	R. Aaij *et al.*	(LHCb Collab.)
PDG	14	CP C38 070001	K. Olive *et al.*	(PDG Collab.)
SOLOVIEVA	09	PL B672 1	E. Solovieva *et al.*	(BELLE Collab.)
AUBERT	07AH	PRL 99 062001	B. Aubert *et al.*	(BABAR Collab.)
LINK	03C	PL B561 41	J.M. Link *et al.*	(FNAL FOCUS Collab.)
AMMAR	02	PRL 89 171803	R. Ammar *et al.*	(CLEO Collab.)
CRONIN-HEN...	01	PRL 86 3730	D. Cronin-Hennessy *et al.*	(CLEO Collab.)
ADAMOVICH	95B	PL B358 151	M.I. Adamovich *et al.*	(CERN WA89 Collab.)
FRABETTI	95D	PL B357 678	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	94H	PL B338 106	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
FRABETTI	93	PL B300 190	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
ALBRECHT	92H	PL B288 367	H. Albrecht *et al.*	(ARGUS Collab.)
BIAGI	85B	ZPHY C28 175	S.F. Biagi *et al.*	(CERN WA62 Collab.)