Table 12.18 from (1975AJ02): States of $^{12}$C from $^{12}$C(e, e')$^{12}$C

<table>
<thead>
<tr>
<th>$E_x$ (MeV)</th>
<th>$J^\pi; T$</th>
<th>$\Gamma_{\gamma 0}$ (eV)</th>
<th>Refs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.44</td>
<td>$2^+; 0$</td>
<td>$(10.6 \pm 1.1) \times 10^{-3}$</td>
<td>(1967CR01)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$(11.0 \pm 1.0) \times 10^{-3}$</td>
<td>(1970ST10)</td>
</tr>
<tr>
<td>7.66 b</td>
<td>$0^+; 0$</td>
<td>$(6.2 \pm 0.6) \times 10^{-5}$</td>
<td>(1967CR01)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$(5.9 \pm 0.5) \times 10^{-5}$</td>
<td>(1970ST10)</td>
</tr>
<tr>
<td>9.64</td>
<td>$3^-; 0$</td>
<td>$(3.1 \pm 0.4) \times 10^{-4}$</td>
<td>(1967CR01)</td>
</tr>
<tr>
<td>10.84</td>
<td>$1^-; 0$</td>
<td></td>
<td>(1969TO01, 1971NA14)</td>
</tr>
<tr>
<td>12.71 c</td>
<td>$1^+; 0$</td>
<td>$0.35 \pm 0.05$ (M1)</td>
<td>(1974CE01)</td>
</tr>
<tr>
<td>14.08 d</td>
<td>$4^+; 0$</td>
<td></td>
<td>(1971NA14)</td>
</tr>
<tr>
<td>15.11 g</td>
<td>$1^+; 1$</td>
<td>$35.74 \pm 0.86$</td>
<td>(1972SP1C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$37.0 \pm 1.1$</td>
<td>(1973CH16)</td>
</tr>
<tr>
<td>16.11 g</td>
<td>$2^+; 1$</td>
<td>$0.83 \pm 0.06$</td>
<td>(1969GU05)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$1.8 \pm 0.5$</td>
<td>(1963BO36, 1965BI1B)</td>
</tr>
<tr>
<td>16.58</td>
<td>$2^-; 1$</td>
<td></td>
<td>(1970AN1C, 1971YA03)</td>
</tr>
<tr>
<td>17.6 ± 0.2</td>
<td>$1^-$</td>
<td></td>
<td>(1969GU05)</td>
</tr>
<tr>
<td>18.6 ± 0.1</td>
<td>(3$^-$) $^1$</td>
<td></td>
<td>(1970TO13, 1971YA03)</td>
</tr>
<tr>
<td>19.3</td>
<td>$2^-; 1$</td>
<td></td>
<td>(1968BE1H, 1968DR01, 1969GU05, 1970AN1C, 1971YA03)</td>
</tr>
<tr>
<td>19.6 ± 0.1 g</td>
<td>(4$^-$)</td>
<td></td>
<td>(1970TO13, 1971BE51, 1971YA03)</td>
</tr>
<tr>
<td>20.0 ± 0.1 g</td>
<td>(2$^+$)</td>
<td></td>
<td>(1968BE1H, 1969GU05, 1970TO13, 1971YA03)</td>
</tr>
<tr>
<td>20.6 ± 0.1 g</td>
<td>(3$^+$)</td>
<td></td>
<td>(1968BE1H, 1969GU05, 1970TO13, 1971YA03)</td>
</tr>
<tr>
<td>21.6 ± 0.1 h,i</td>
<td>(3$^-$) $^1$</td>
<td></td>
<td>(1969GU05, 1970TO13, 1971YA03)</td>
</tr>
<tr>
<td>22.0 ± 0.1 h,i</td>
<td>(1$^-$) $^1$</td>
<td></td>
<td>(1970TO13, 1971YA03)</td>
</tr>
<tr>
<td>22.7 ± 0.1 e,f,h,i</td>
<td>(1$^-$)</td>
<td></td>
<td>(1969GU05, 1970TO13, 1971BE51, 1971YA03)</td>
</tr>
<tr>
<td>23.8 ± 0.1 h</td>
<td>(1$^-$) $^1$</td>
<td></td>
<td>(1969GU05, 1970TO13, 1971YA03)</td>
</tr>
<tr>
<td>24.9 ± 0.2 j</td>
<td></td>
<td></td>
<td>(1969GU05)</td>
</tr>
<tr>
<td>25.5 h,i,j</td>
<td>(1$^-$)</td>
<td></td>
<td>(1971BE51, 1971YA03)</td>
</tr>
<tr>
<td>25.5 h,i</td>
<td>(3$^-$)</td>
<td></td>
<td>(1971YA03)</td>
</tr>
<tr>
<td>26.4 ± 0.3 h,i</td>
<td></td>
<td></td>
<td>(1969GU05)</td>
</tr>
<tr>
<td>27.8 ± 0.2 i</td>
<td></td>
<td></td>
<td>(1969GU05)</td>
</tr>
<tr>
<td>30.2 ± 0.4 i</td>
<td></td>
<td></td>
<td>(1969GU05)</td>
</tr>
<tr>
<td>32.3 ± 0.3</td>
<td></td>
<td></td>
<td>(1969GU05)</td>
</tr>
</tbody>
</table>
a See also Table 12.20 and reaction 36 in (1968AJ02) and Table 12.9.
b The matrix element is $5.48 \pm 0.22$ fm$^2$ for the E0 decay by $\pi$ to $^{12}_{\text{C,g.s.}}$ (1968ST20).
c $\Gamma_{\text{tot}} = 14.6 \pm 2.6$ eV (1974CE01).
d $\Gamma \approx 0.3$ MeV (1971NA14).
e The giant dipole resonance has an average $E_\chi = 23.0 \pm 0.7$ MeV and $\Gamma = 5.7 \pm 0.7$ MeV (1969GU05).
f May involve fine structure at $E_\chi = 22.2, 22.8, 23.4$ and 23.8 MeV.
g See also (1968DO08).
h See also (1970LI02).
i See also (1968RI06).
j See also (1970AN1C).
k (1969GU05) have recalculated this value and suggest that it should be 1.0 eV.
l See (1972AN03). Widths for these states have also been calculated.