Voting results on September 9, 2006 in QCL workshop in Bari, Italy

On September 9, 2006 during the last wrap-up session of the 2nd International Workshop on Quantum Cascade Lasers held in Bari Italy, all the present participants were asked to vote on the likelihood that a particular milestone will be achieved in two years by the 3rd International Workshop on Quantum Cascade Lasers. Several of these milestones were suggested at the 1st International Workshop on Quantum Cascade Lasers in 2004, and several were added during the present one. Below is the recorded list of the milestones and the total votes each received. We will revisit this list in the third QCL workshop in 2008 to see how accurate our collective vision is, and may come up with a new list then.

<table>
<thead>
<tr>
<th>Milestones to be achieved in approximately two years by the 3rd International Workshop on Quantum Cascade Lasers in 2008</th>
<th>Votes received (Seville, 2004)*</th>
<th>Votes received (Bari, 2006) with total 39 present (out of total 54 workshop participants).</th>
</tr>
</thead>
<tbody>
<tr>
<td>CW 4-10 µm QCL operating at room temperature with &gt;1 W output power</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>Commercial QCL market with &gt;$10M/year</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>CW 25% wall-plug efficiency of 4-10 µm QCL at 300 K</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Exp. demonstration of 100-GHz modulation of QCLs</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Quantum-dot 2P→1S spontaneous emission in 1 year, stimulated emission in 2 years</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Wide tunability at THz frequencies (&gt;10 %)</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Lowering cost of QCL ($2k/dev for &gt;10 devices)</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>THz QCL operating above thermoelectric cooler temperature (&gt; 240 K)</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>QCL based on Si/Ge, GaN, or other materials</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>QCL operating below 1 THz, in the frequency range of electronic devices</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Wide tunability at 4-10 µm</td>
<td>12</td>
<td>ACHIEVED</td>
</tr>
<tr>
<td>RT THz generation by using nonlinear QCLs</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>CW RT QCL/ICL &lt; 3 micrometers</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td>RT QCL 1mJ single pulse PW: &lt; 20 microseconds</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>THz commercial product involving QCLs</td>
<td>-</td>
<td>15</td>
</tr>
</tbody>
</table>
(*) The voting at the 1st QCL workshop in 2004 followed a different rule. All the present participants were asked to suggest a list of main challenges facing QCL researchers. They were then asked to vote for the three most significant out of the entire list. Even though it was suggested that each participant could vote only for maximum of three choices, this suggested rule was not enforced. In essence, that voting reflected partially the participants' preference on the wish list and partially on their view of likelihood to achieve them. Thus the interpretation of that voting record is somewhat different from the present one, which is purely a collective prediction of future outcomes.