Multiple YSOs in the low-mass star-forming region IRAS 00213+6530

Abstract:
IRAS 00213+6530 is a low-mass star-forming region containing a molecular outflow and a H2O maser (Han et al. 1998), and associated with an ammonia dense core, suggesting that star formation in this region is taking place in the isolated mode. However, the high angular resolution VLA observations reveal four sources with very different properties in the infrared, millimeter, and centimeter range. One of the sources has a very negative spectral index, and its nature remains unclear. In the previous H2O maser observations (single dish) the pointing accuracy of the telescope was 20". Thus, we request VLA exploratory time to observe the H2O maser emission toward IRAS 00213+6530 in order to identify which of the four sources is associated with the H2O maser.

Authors:

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Email</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gemma Busquet</td>
<td>Barcelona, Universidad de</td>
<td><a href="mailto:gbusquet@am.ub.es">gbusquet@am.ub.es</a></td>
<td>Graduate Student Year: 2010 Thesis: Yes</td>
</tr>
<tr>
<td>Aina Palau</td>
<td>Barcelona, Universidad de</td>
<td><a href="mailto:apalau@am.ub.es">apalau@am.ub.es</a></td>
<td></td>
</tr>
<tr>
<td>Robert Estalella</td>
<td>Barcelona, Universidad de</td>
<td><a href="mailto:robert.estalella@am.ub.es">robert.estalella@am.ub.es</a></td>
<td></td>
</tr>
<tr>
<td>Josep Girart</td>
<td>Unknown</td>
<td><a href="mailto:girart@ieec.cat">girart@ieec.cat</a></td>
<td></td>
</tr>
</tbody>
</table>

Principal Investigator: Gemma Busquet

Contact author: Gemma Busquet
Telephone: 3493 4039229
Email: gbusquet@am.ub.es

Joint: Not a Joint Proposal

Observing type(s): Spectroscopy, *
**Resources:**

<table>
<thead>
<tr>
<th>Resource name</th>
<th>Tele. Conf.</th>
<th>Frontend &amp; Backend</th>
<th>Set up</th>
</tr>
</thead>
</table>
| H2O maser     | VLA C       | K Band 1.3 cm 21200 - 25200 MHz VLA Correlator - Spectral Line | IF mode: 4  
Bandwidth: 3.125 MHz  
Number of channels: 64  
Spectral resolution: 48.828 kHz  
Rest frequencies: 22485.1,22435.1 MHz |
| 1.3cm         | VLA C       | K Band 1.3 cm 21200 - 25200 MHz VLA Correlator - Spectral Line | IF mode: 4  
Bandwidth: 25 MHz  
Number of channels: 8  
Spectral resolution: 3125.0 kHz  
Rest frequencies: 22485.1,22435.1 MHz |

**Sources:**

<table>
<thead>
<tr>
<th>Source name</th>
<th>RA / RA Range</th>
<th>DEC / DEC Range</th>
<th>System</th>
<th>Velocity/z</th>
<th>Group name</th>
</tr>
</thead>
<tbody>
<tr>
<td>I00213</td>
<td>00:24:11.4</td>
<td>65:47:09</td>
<td>J2000</td>
<td>-10.3 km/s</td>
<td>-</td>
</tr>
</tbody>
</table>
### Sessions:

<table>
<thead>
<tr>
<th>Session Name</th>
<th>Session Time</th>
<th>Repeat</th>
<th>Separation</th>
<th>LST Minimum</th>
<th>LST Maximum</th>
<th>Elevation Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-H2O</td>
<td>0.25 hour</td>
<td>1</td>
<td>0 day</td>
<td>00:00:00</td>
<td>24:00:00</td>
<td>0</td>
</tr>
<tr>
<td>C-1.3cm</td>
<td>0.25 hour</td>
<td>1</td>
<td>0 day</td>
<td>00:00:00</td>
<td>24:00:00</td>
<td>0</td>
</tr>
</tbody>
</table>

### Session Constraints:

<table>
<thead>
<tr>
<th>Session Name</th>
<th>Constraint</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-H2O</td>
<td></td>
<td>This observation of H2O maser is made simultaneously with the 1.3 cm observation, which has a different source-resource pair but which will be observed simultaneously with this source-resource pair, using 2IF for the H2O maser and 2IF for the 1.3 cm continuum emission.</td>
</tr>
<tr>
<td>C-1.3cm</td>
<td></td>
<td>This observation of 1.3 cm is made simultaneously with the H2O maser observation, using the 4 IF mode with 2 IF for the 1.3 cm continuum emission and 2 IF for the maser emission. Therefore the total amount of time for this simultaneous observation is 0.5 hours.</td>
</tr>
</tbody>
</table>

### Session Source/Resource Pairs:

<table>
<thead>
<tr>
<th>Session Name</th>
<th>Source</th>
<th>Resource</th>
<th>Time</th>
<th>Figure of Merit</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-H2O</td>
<td>I00213/</td>
<td>H2O maser</td>
<td>0.25 hour</td>
<td>4mJy/bm</td>
</tr>
<tr>
<td>C-1.3cm</td>
<td>I00213/</td>
<td>1.3cm</td>
<td>0.25 hour</td>
<td>0.5mJy/bm</td>
</tr>
</tbody>
</table>

### Total Time per Configuration:

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Total Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.5</td>
</tr>
</tbody>
</table>