The New MCC30/15 Cyclotron at JYFL
P. Heikkinen
JYFL, Finland

Arctic Workshop, Saariselkä
April 20, 2009
The JYFL K130 Cyclotron
• Very little time for maintenance
• Practically no time for machine development
• 1/3 of the beams could be accelerated with a 30 MeV H⁻ cyclotron
- 30 different isotopes
- 20 – 30 % protons
  - mainly for proton induced fission and 123-I production
- Cocktails for space electronics testing (ESA)
New cyclotron

- 30 MeV H⁻ cyclotron MCC30/15
  - from NIIEFA (Efremov Institute, St. Petersburg)
  - as a partial compensation of former Soviet Union debt to Finland (Inter-governmental agreement between Finland and Russia, August 15, 2006)
  - Full system with two beam lines
    - beams for IGISOL (p-induced fission) and MAP Medical Technologies (123-I)
    - two extractions
      - e.g. 18-F production

- First beam in 2009
Contract, February 20th, 2007

University of Jyväskylä:
Rector Aino Sallinen
Adm. Director Erkki Tuunanen

Alexey Lyutik, Machinoimport
Mikhail Vorogushin, NIIEFA
(Valery Shlyamin, Russian Trade Representative)
20.06.2007. Our Ref. № 50-0705/081
To Your Ref. № ________ Dt. _____________

University of Jyvaskyla, Finland
Department of Physics
Attn.: Mr. Pauli Heikkinen
e-mail: Pauli.Heikkinen@phys.jyu.fi

Dear Mr. Heikkinen,

We are pleased to inform you that our mutual Contract No 50-0701/052174
dated 20.02.2007, for the delivery of Cyclotron was finally approved by the
Russian Authorities on 19th of June 2007. So, this date could be the date of coming
the Contract into force if you have already received the approval of the Ministry of
Trade and Industry of Finland. Please kindly confirm this as soon as possible
in order we could give official notification

The Contract (invoice with TAP P
will be forwarded for your

Looking for...
## Specifications

<table>
<thead>
<tr>
<th></th>
<th>H⁻</th>
<th>d⁻</th>
<th>Beam current</th>
<th>18 – 30 MeV</th>
<th>9 – 15 MeV</th>
<th>100/50 μA</th>
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<tbody>
<tr>
<td><strong>Beam</strong></td>
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<td><strong>Power consumption</strong></td>
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<td>Stand by</td>
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<td>&lt; 15 kW</td>
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<td>Beam on</td>
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<td>&lt;120 kW</td>
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<td><strong>Magnetic structure</strong></td>
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<tr>
<td>pole diameter</td>
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<td>140 cm</td>
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<td>sectors</td>
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<td>&lt;B&gt;</td>
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<td>1.336 T</td>
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<td>coil power</td>
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<td>10 kW</td>
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<td>weight (Fe/Cu)</td>
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<td>40/2.5 t</td>
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<tr>
<td>RF-system</td>
<td>number of dees</td>
<td>dee angle</td>
<td>frequency</td>
<td>dee voltage</td>
<td>dissipated RF power/dee</td>
<td>RF-gen output power</td>
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<td>2</td>
<td>42 deg</td>
<td>40.68 MHz</td>
<td>35 – 40 kV</td>
<td>&lt;8 kW</td>
<td>25 kW</td>
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<tr>
<th>Ion source</th>
<th>type</th>
<th>location</th>
<th>arc power</th>
<th>current</th>
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<tr>
<td></td>
<td>CUSP</td>
<td>external</td>
<td>&lt;3 kW</td>
<td>1.5/0.7 mA</td>
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<tr>
<td>Vacuum pumps</td>
<td>Control system</td>
<td>2 cryo</td>
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<td></td>
<td>programmable controller with a computer</td>
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The status of the MCC-30/15
Cyclotron manufacturing

- **Magnet:**
  - Last shimming in progress
- **RF system:**
  - Waiting for factory Acceptance Test
- **RF Generator:**
  - The Contract/order placed at QEI Corporation (USA).
  - The generator now at NIIEFA
• **Vacuum System:**
  – The Contract/order placed at Intech Analytic Company (authorized dealer of Edwards in Russia).
  – The components now at NIIEFA

• **Power Supplies for electromagnets:**
  – The Power Supplies now at NIIEFA
• Power supply units for the ion source and injection line
  – purchased

• Metal frameworks of racks for the Control System
  – purchased

• Main components of the Control System (Mitsubishi LPC and so on)
  – purchased

• The Magnetic Field Measurement Stand
  – built

• Assembling of the MCC-30/15 Cyclotron for the Factory Tests is planned in March 2009
Part of the MCC-30/15 cyclotron magnet half-yoke on machining
Vacuum chamber wall of the MCC-30/15 cyclotron on machining
Part of the MCC-30/15 cyclotron magnet half-yoke on machining
Pole tips of the MCC-30/15 cyclotron magnet
Support frame of the MCC-30/15 cyclotron magnet
Parts of the MCC-30/15 cyclotron magnet half-yokes
Support frame of the cyclotron magnet on welding
Sector side plates of the cyclotron magnet
The sector of the cyclotron on machining
Coils of the cyclotron magnet
Magnetic field measurement stand.
The CC-12 cyclotron magnet on measuring
The line with Hall sensors of the magnetic field measurement apparatus
Moving shims to adjust the field for H⁻ and d⁻
Accelerating electrodes
Ion source on the stand
Injector powersupplies
New Laboratory
Cyclotron bunker