The High Acceptance Di-Electron Spectrometer (HADES) aims at measuring in-medium modifications of light vector mesons ($\rho, \omega, \phi$) in nuclear matter. Such modifications of hadron properties are predicted by various models based on fundamental principles like chiral symmetry and QCD.

The HADES setup is nearly complete; it includes the most detector units, read-out, data-acquisition and trigger electronics. The ring imaging Cherenkov counters (RICH), the inner multiwire drift chambers (MDC-I, MDC-II), the time of flight scintillation hodoscopes (TOF, TOFINO) and the pre-shower modules were completely installed. The performance of the drift chambers as well as all other detectors were monitored online.

Up to now four large-area drift chamber modules of MDC-III, produced at FZ Rossendorf, and two MDC-IV modules, prepared at IPN Orsay, for the outer tracking planes were installed. All six modules of MDC-III were produced at the Rossendorf detector workshop. Thus, two sectors of the spectrometer are fully equipped.

The angular acceptance of each segment amounts to $\phi = 0^\circ - 60^\circ$ and $\theta = 18^\circ - 85^\circ$.

The HADES collaboration [1] performed three measuring periods in the year 2002 (see Tab. 1).

<table>
<thead>
<tr>
<th>Reaction</th>
<th>E/A [GeV]</th>
<th>Events</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>C+C</td>
<td>0.6; 0.8</td>
<td>$10^9$</td>
<td>DAQ commissioning</td>
</tr>
<tr>
<td>Mg+C</td>
<td>1.0</td>
<td>$10^8$</td>
<td>benchmark beamtime</td>
</tr>
<tr>
<td>C+C</td>
<td>2.0</td>
<td>$10^9$</td>
<td>production beamtime</td>
</tr>
</tbody>
</table>

Tab. 1 HADES beamtime at 2002.

First physics studies, aimed at measuring electron-positron pairs produced in relativistic collisions of C+C started in 2001 and have been continued extensively in 2002.

In the November/December 2002 beam time a 2 GeV/nucleon carbon beam with an averaged intensity of $1 \times 10^7$ particles per spill hit a carbon target. The spill length amounted to 9.5 s. The target was 3 mm in diameter and had a length of $2 \times 3$ mm. A fast twofold hardware selection was implemented with the first level and the second level triggers. These triggers reduced the data by more than one order of magnitude. Using these triggers, most of the detected reaction products were protons and pions. Tab. 2 shows the accumulated statistics for different trigger levels.
Future runs, especially for heavier collision systems require therefore a threefold trigger which is able to reduce the event rate up to a factor of $10^{-4}$ by preselecting lepton pair candidates to about 100 events/sec. The first level trigger selects central events via the multiplicity information from the TOF scintillators. The second level trigger selects events with dilepton pairs within a given invariant mass range. Pattern recognition units detect electron or positron signatures from Cherenkov rings and electromagnetic showers as well as appropriate time of flight candidates in the TOF wall. In the third level trigger, tracking information from the MDC will be used to reduce the number of fake leptons.

During the beam time we stored $2.13 \times 10^8$ events at high magnetic field generated by a current of $I = 2500$ A. A few files were taken without magnetic field for calibration purposes.

A restricted data analysis is available already during the data collection stage and can be used for the monitoring of different parameters to check the detector performance.

As an example of the monitoring process the vertex distribution along the beam axis around the target region is shown in Fig. 1. The reconstruction has been performed only with a drift cell combination. The insert of Fig. 1 shows, that the vertex reconstruction with this cluster finding algorithm is able to identify the two carbon target discs separated by a distance of $\Delta Z = 20$ mm along the beam axis.

The HADES spectrometer is designed to allow a measurement of the dilepton mass spectrum with an invariant mass resolution of about one percent. Fig. 2 shows the result of the simulated dilepton mass spectrum for the HADES spectrometer. Only conventional sources have been included in the simulation.

The present measurement can determine the $e^+e^-$ yield in the invariant mass region around 500 MeV/$c^2$. In this region the the DLS collaboration reported [2] a puzzling large yield. The excess of the dileptons in the same invariant mass region, observed by the CERES collaboration [3], can be explained by a strong reshaping of the $\rho$ meson strength. It is therefore important to have sufficiently rich statistics to resolve the $\rho$ and $\omega$ peaks to address this issue in more detail.

![Fig. 1 Vertex reconstruction with the smallest MDC--I and a large MDC--III in one HADES sector. The cluster finding method requires that the magnet is off to get straight flight paths. The insert is explained in the text.](image1)

![Fig. 2 Expected frequency of $e^+e^-$ pairs generated in C+C collisions at 2 AGeV versus invariant dilepton mass. The spectra are obtained under realistic assumptions for detector properties. The low (high) combinatorial background is obtained with the best (worst) spatial drift chamber resolution. An amount of $9 \times 10^6$ $e^+e^-$ pairs is generated in $2 \times 10^9$ target collisions.](image2)

In 2003 one of the main foci of the collaboration is the analysis of the data taken in 2002; this includes the optimization of the analysis software. Moreover we plan to improve the reliability of the the detector components. For this case one important point is the understanding of the drift chamber aging. New measurements with proton and pion beams are foreseen for the second half of 2003.