Neutral hydrogen

Absorption and emission spectra of the HI line
Neutral hydrogen
All-Sky Survey in the HI line (Leiden/Argentina/Bonn)

see http://www.astro.uni-bonn.de/~webrai/german/tools_labsurvey.php
Neutral hydrogen

High-velocity sky: structures / clouds with $|v - v_{rot}| > 50 \text{ km s}^{-1}$
Neutral hydrogen

High-velocity clouds

HVC with head-tail structure observation with 100-m and WSRT
Neutral hydrogen

HI in M 33

column density (blue) on Hα (pink) and NIR (yellow)

HI velocity field; blue: approaching gas; red: receding gas
Neutral hydrogen

HI in NGC 6946: note the huge extent of the gaseous disk

optical  neutral hydrogen
Neutral hydrogen

HI in NGC 891: note the large extensions into the halo regime
Neutral hydrogen

HI in NGC 3741: the largest HI disk in terms of optical size, viz. 43 optical scale lengths!
Neutral hydrogen

Constituents of the gaseous ISM

<table>
<thead>
<tr>
<th></th>
<th>MM</th>
<th>CNM</th>
<th>WNM</th>
<th>WIM</th>
<th>HIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n [\text{cm}^{-3}])</td>
<td>(10^2 \ldots 10^5)</td>
<td>4 \ldots 80</td>
<td>0.1 \ldots 0.6</td>
<td>~ 0.2</td>
<td>(10^{-3} \ldots 10^{-2})</td>
</tr>
<tr>
<td>(T [K])</td>
<td>10 \ldots 50</td>
<td>50 \ldots 200</td>
<td>5500 \ldots 8500</td>
<td>~ 8000</td>
<td>(10^5 \ldots 10^7)</td>
</tr>
<tr>
<td>(h [\text{pc}])</td>
<td>~ 70</td>
<td>~ 140</td>
<td>~ 400</td>
<td>~ 900</td>
<td>\geq 1 \text{ kpc}</td>
</tr>
<tr>
<td>(f_{\text{vol}})</td>
<td>&lt; 1%</td>
<td>~ 2% \ldots 4%</td>
<td>~ 30%</td>
<td>~ 20%</td>
<td>~ 50%</td>
</tr>
<tr>
<td>(f_{\text{mass}})</td>
<td>~ 20%</td>
<td>~ 40%</td>
<td>~ 30%</td>
<td>~ 10%</td>
<td>~ 1%</td>
</tr>
</tbody>
</table>

MM : molecular medium  
CNM : cold neutral medium  
WNM : warm neutral medium  
WIM : warm ionised medium  
HIM : hot ionised medium