**μSR study of parimagnetism in HoCo$_2$ under hydrostatic pressure**

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**Introduction**

- HoCo$_2$ crystallizes in the Laves cubic phase (C15)
- Ho – localized 4f-magnetic moment
- Co – itinerant 3d-electron moment
- $T < T_C$ (80K) – ferrimagnetic ordering in HoCo$_2$
- $T > T_C$ – Co moments survive in paramagnetic region
  $\rightarrow$ ferromagnetic clusters (Co moments) coupled antiparallel to the nearest neighbor Ho – moments → **PARIMAGNETIC configuration** [1-4]
  $\rightarrow$ characteristic temperature – flipping temperature $T_f$ (125 K)

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**Experimental**

- Samples prepared by arc-melting, characterized by XRD and EDX
- AC-susceptibility at ambient pressure – MPMS (Quantum Design)
- Under hydrostatic pressure:
  - AC-susceptibility
  - **μSR spectroscopy**

<table>
<thead>
<tr>
<th>Material pressure cell</th>
<th>AC-susceptibility</th>
<th>μSR spectroscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CuBe bronze + NiCrAl</td>
<td></td>
<td>NP35N alloy</td>
</tr>
<tr>
<td>Nominal pressure</td>
<td>3 GPa</td>
<td>2 GPa</td>
</tr>
<tr>
<td>Medium</td>
<td>Daphne 7373</td>
<td>Daphne 7373</td>
</tr>
<tr>
<td>Manometer</td>
<td>Manganin wire</td>
<td>Indium</td>
</tr>
</tbody>
</table>

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**Parimagnetic configuration survive in $p < 3$ GPa and Co magnetic clusters survive in $p < 2$ GPa**

$T_f$ is mainly controlled by Ho-Co ex. interaction.

$T^*$ is mainly controlled by Co-Co ex. interaction.

$T^*$, $T_f$ and $T_C$ evolve with pressure in the same manner $\Rightarrow$ some connection among effects.

Pressure causes the lost of Co magnetism [6] $\Rightarrow$ the shift of $T_C$ and weakening of Ho-Co ex. inter.

$\Rightarrow$ Possible connection among $T^*$, $T_f$ and $T_C$ is via Co-Co interaction. Because we can imagine that $T_C$ is direct by Ho-(Co mag. clusters).

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**References:**


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