The first attempt of joint analysis of P-even forward-backward asymmetry together with P-even left-right and P-odd asymmetry coefficients as a function of neutron energy inside the range (0.02-8)eV has met with some obstacle as contrasted to the case of ^{233}U fission analysed earlier [1] (look in this book as well). It can be considered as some support above-mentioned remark about possible extra sensitivity of ^{239}Pu data to the theoretical suppositions.

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STUDY OF dμd AND pμd FUSION IN D_2 AND HD MIXTURES

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This experiment was introduced last year as a new investigation of muon catalyzed fusion with greatly increased absolute precision [1]. The main improvements, developed in Gatchina, include a redesigned high pressure ionization chamber with 15 cm^3 sensitive reaction volume and ~50 keV FWHM energy resolution, a temperature control system operating with $\pm$0.1 K stability, and a chemical gas treatment apparatus producing ultra clean samples of HD molecules with concentrations $c_{HD} \sim 94\%$ [2]. In two experimental runs we collected fusion data over a temperature range from 28 K to 350 K at gas densities from 3%-8% of liquid H_2.

Preliminary results of the 1994 run were presented at the international μCF-95 conference in Dubna [3]. Fig.1 shows the temperature dependence of spin separated $d\mu d$ formation rates in D_2, λ_F, characteristic for the resonant formation mechanism. For comparison previous measurements and the theory curves are also shown. Our new data will determine the *dd* fusion rate and the $d\mu d$ resonance energy to very high precision allowing rigorous tests of the theory.

Fig.2 displays the new data about the μd spin flip rate $\lambda_{3/2,1/2}$. The curves represent the theoretical expectations, (a) from the inelastic scattering process only (dashed line),

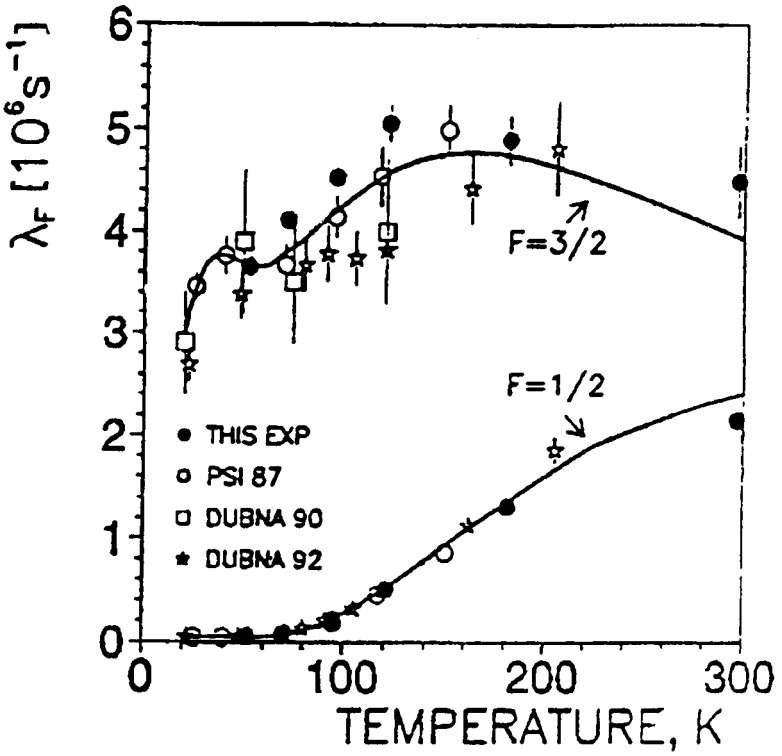

Fig.1. New and old $d\mu d$ formation rates λ_F in D_2 versus temperature (from ref.[3])

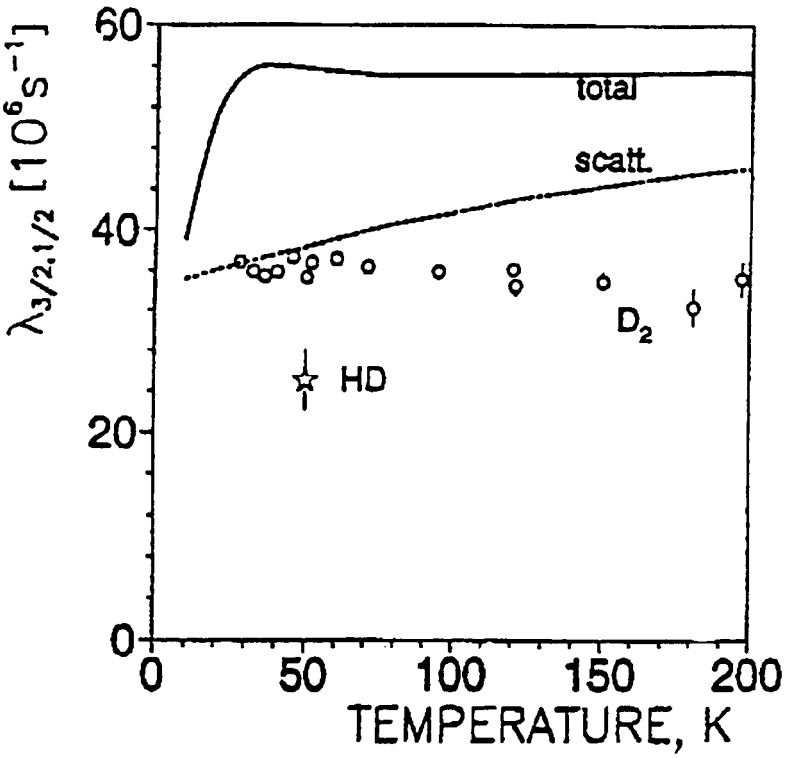

Fig.2. New μd spin flip rates $\lambda_{3/2,1/2}$ versus temperature in D_2 (circles) and HD gas (star)

(b) the same by including the term of resonant $d\mu d$ formation followed by backdecay (full line), see ref. [4]. The HD data point at 50 K (star) is significantly lower than the D_2 results (full circles). It provides first direct experimental evidence that the resonant spin flip term (absent in HD molecules) really exists in D_2 at the predicted intensity. Thus, inelastic scattering $\mu d + d$ will need more theoretical attention to get the theory in accord with the experimental observations.

This experiment will be continued in 1996, primarily with more detailed investigations of the so far poorly known μCF processes with HD molecules.

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PRECISION MEASUREMENT OF NUCLEAR μ-CAPTURE BY ^{3}He

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In [1] we described a new experiment at PSI with the goal to determine the spin-averaged rate Λ^{stat} of the nuclear muon capture reaction

$$\mu^- + {}^3\mathrm{He} \longrightarrow \nu_\mu + {}^3\mathrm{H} \qquad (1)$$

at high precision. This reaction probes the elementary semi-leptonic weak interaction process $\mu^- + p \rightarrow n + \nu_\mu$ and due to its simplicity (superallowed transition in the A = 3 nuclear system) is directly sensitive to the induced pseudo-scalar coupling constant g_P.

The data from a run of four weeks in 1993 were independently analyzed by two subgroups of our collaboration, and consistency was found within the error bars. Based on $3.75 \cdot 10^8$