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CF excitations of $CeCu_2Si_2$: Revisited employing a single crystal and triple-axis spectrometers MICHAEL LOEWENHAUPT, Tech Univ Dresden, SERGEY DANILKIN, GUOCHU DENG, ANSTO, KLAUDIA HRADIL, TU Wien, OLIVER STOCKERT, MPI-CPfS, ASTRID SCHNEIDEWIND, JCNS-MLZ — $CeCu_2Si_2$ is the famous heavy-fermion system showing unconventional superconductivity mediated by low-energy magnetic excitations of the CF ground-state doublet. From the point symmetry of the Ce^{3+} ions in the tetragonal crystal lattice a CF splitting into 3 doublets is expected for the (J=5/2) multiplet. First INS measurements on polycrystalline samples of $CeCu_2Si_2$ employing a time-of-flight technique revealed a CF level scheme of 0-12-30 meV but were disputed by more advanced INS data in subsequent years. Finally it was accepted that the CF excitations of $CeCu_2Si_2$ consist of only one very broad transition with 30 meV from the ground-state doublet to both of the more or less degenerated excited CF states, the so called "quasi-quartet." Employing a large single crystal of $CeCu_2Si_2$ and the thermal neutron triple-axis spectrometers PUMA at FRM II and TAIPAN at OPAL we revisited the CF-transitions to verify or falsify this interpretation. We performed TAS measurements for different crystallographic directions. From our results we infer that the quasi-quartet actually consists of two doublets situated at 30 and 35 meV exhibiting a strong directional dependence of their transition matrix elements to the ground state doublet.

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