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Superheavy Elements studied with TASCA at GSI

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In the quest for superheavy elements, the heaviest element currently claimed in the literature is that with atomic number Z=118 [1]. At GSI Darmstadt, experiments on the synthesis of elements beyond Z=118 have been undertaken in the past two years. The gas-filled "TransActinde Separator and Chemistry Apparatus" TASCA [2], which is optimized for investigations of superheavy elements produced in actinide target-based hot fusion reactions, has proven its excellent performance, e.g., in studies on the synthesis and decay of ^{288,289}Fl (Z=114) [3, 4] and other scientific topics [5].

The two reactions ^{50}Ti + ^{249}Cf $\rightarrow$ ^{299}120* and ^{50}Ti + ^{249}Bk $\rightarrow$ ^{299}119* were selected to search for the new elements Z=119 and Z=120 because they are generally predicted to yield the highest cross sections among the feasible reactions leading to these two new elements. In several-months long campaigns, high sensitivity was reached, especially in the search for element 119. In a separate experiment, synthesis and decay of element 117 in the ^{48}Ca + ^{249}Bk $\rightarrow$ ^{297}117* reaction was studied. The data are currently under analysis.

The results of these three experiments will be presented and their impact on the future perspectives in the search of new elements will be discussed.

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