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Title: On the Davenport-Heilbronn theorems and second order terms. Preliminary report.

In this joint work with Manjul Bhargava and Jacob Tsimerman, we present an elementary proof of the Davenport-Heilbronn theorems which give the main term in the asymptotic for the number of cubic fields having bounded discriminant as well as the main term in the asymptotic for the total number of 3-torsion elements in the class groups of quadratic fields having bounded discriminants. We also prove a conjecture of Roberts that gives the second main term for the first Davenport-Heilbronn theorem. (Received September 03, 2010)