1030-05-17 **John B Polhill*** (jpolhill@bloomu.edu), Department of Math/CS/Stat, 1123 McCormick Center, 400 East Second Street, Bloomsburg, PA 17815. *New Negative Latin Square Type Partial Difference Sets in Nonelementary Abelian 2-groups and 3-groups.* Preliminary report.

A partial difference set having parameters $(n^2, r(n-1), n+r^2-3r, r^2-r)$ is called a *Latin square type* partial difference set, while a partial difference set having parameters $(n^2, r(n+1), -n+r^2+3r, r^2+r)$ is called a *negative Latin square type* partial difference set. In this paper, we develop three product theorems that construct negative Latin square and Latin square type partial difference sets in direct products of abelian groups G and G' when these groups have certain Latin square or negative Latin square type partial difference sets. Using these product theorems, we can construct negative Latin square type partial difference sets in nonelementary abelian 2-groups and 3-groups. Several constructions of Latin square type PDSs are also given in p-groups for all primes p. Using these results, we construct amorphic association schemes with 4 classes using negative Latin square type graphs in many nonelementary abelian 2-groups; we also use negative Latin-square type graphs whose underlying sets can be elementary abelian 3-groups or nonelementary abelian 3-groups to form 3-class amorphic association schemes. (Received June 08, 2007)