Meeting: 1000, Albuquerque, New Mexico, SS 5A, Special Session on Categories and Operads in Topology, Geometry, Physics and Other Applications

1000-68-157 **William S Page*** (bill.page1@sympatico.ca), 2046 Middle Rd., Kingston, Ontario K7L 5H6, Canada. *MathAction - Collaborative Mathematics on the Web using Axiom and REDUCE.*

Among those systems which allow one to do mathematics on the computer, *Axiom* is notable for being concerned with the accurate representation of mathematical concepts such as formalized in category theory. Developed over a 30 year period by IBM, NAG and others, Axiom pioneered several new programming concepts including a strongly-typed object-oriented design which has yet to be fully exploited by any other computer algebra system. Axiom is now open source and can be freely installed on desktop workstations. Axiom can also be accessed over the Web through an experimental collaborative interface called *MathAction* that enables LaTeXand Axiom commands to be entered online. Computer generated output is displayed in standard mathematical form on web pages that can later be edited and updated by others. This web interface is easily extended to other packages and now also includes *REDUCE* – a computer algebra system widely used in mathematical physics and of similar vintage as Axiom. Several examples of using MathAction for collaborative research in mathematical physics will be presented including Clifford algebra, exterior differential forms, exact solutions of partial differential equations and for graphical visualizations in quantum mechanics and general relativity. (Received August 23, 2004)