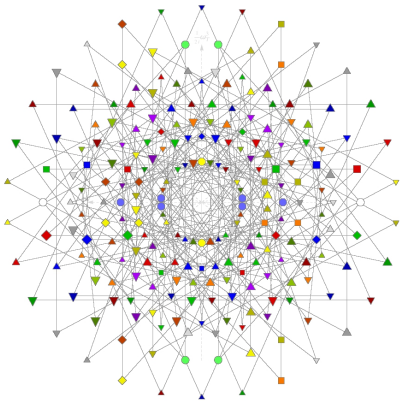

Following the success of the course that Paul Sorba gave 2 years ago, our new PhD students and post docs asked Paul to renew the experience. The *Group Theory and its Applications* cour se is to be delivered over about 10 sittings. The course will cover

1) Elements of group theory and their importance in particle physics

2) Lie groups and Lie algebras

3) Classification of semi-simple Lie algebras

4) Representations of simple Lie algebras

5) Applications: spectroscopy of elementary particles, gauge theory, grand unification models

6) Extensions: superalgebras (for supersymmetry); quantum groups (for integrable systems); exceptional algebras and infinite dimensional algebras (for string theory)

Note:

- The sections 1 to 4 constitute the mathematical basis. Applications to particle physics will be presented during these lectures. - Section 5 will be more or less detailled, depending how much time will be left. - Same thing for Section 6.
- Bibliography: first part ("Lie algebras") of the book "Dictionary on Lie algebras and superalgebras" by L.Frappat, A.Sciarrino and P.Sorba, Academic Press,2000