



**Christian Preuss**  
Monash University

11am

### Colour Structure of Multi-Parton Processes

In today's era of high-energy, high-luminosity collider experiments, multi-jet physics plays a central role. Hence, the treatment of the colour structure of QCD for processes with large parton multiplicities beyond the leading colour approximation gains increased importance for fixed-order computations as well as all-order resummation. However, due to the non-abelian structure of QCD, such computations quickly become highly non-trivial.

I will review Cvitanovic's diagrammatic approach to the colour group and will show how to employ it to compute colour factors of fixed-order QCD amplitudes and to describe the colour evolution of these in the presence of gluon radiation. I will also briefly present a new C++ package to deal with the colour structure and interference effects of gluon radiation in a fully automated way and give a short outlook on possible applications in particle physics phenomenology.



**Michael Bardsley**  
Monash University

11.30am

### BubbleProfiler: finding the field profile and action for cosmological phase transitions

We present BubbleProfiler, a new tool for finding the field profiles and bounce action for a first order cosmological phase transition involving an arbitrary number of scalar fields. BubbleProfiler was released for public use in January. This talk will provide a brief overview of the underlying physical problem and how the code is used to solve it. We will also discuss a recent paper comparing BubbleProfiler to a new technique for solving the same problem using machine learning, as well as the existing CosmoTransitions too which uses a path deformation technique.

**When:** Thursday 7<sup>th</sup> March  
**Time:** 11am  
**Where:** Level 1, Seminar Room 107,  
10 College Walk, Clayton