THE FIELDS INSTITUTE
FOR RESEARCH IN MATHEMATICAL SCIENCES

ABSTRACTS 1.2

OLIVIER SCHIFFMANN
Yale University

i. Hall algebra of the cyclic quiver

We describe the structure of the Hall algebra of the equioriented type $A_n^{(1)}$ Dynkin diagram. We describe its center, and show that it is compatible with the *dual* canonical basis of the Hall algebra. The proof uses the Fock space representation of the Hall algebra, constructed by Varagnolo and Vasserot. As an application, we obtain some positivity results on the canonical basis of the Fock space and, combining with results of Varagnolo and Vasserot, a new proof of Lusztig's character formula for simple modules over the quantum group $U_q(gl(l))$ at an nth root of unity.

ii. Elliptic algebras and weighted projective lines

We give a geometric realisation of quantum affine algebras and quantum 2-toroidal (or elliptic) algebras in terms of the category of coherent sheaves on a weighted projective line defined by Geigle and Lenzing, which one should consider as a noncommutative smooth projective curve. This generalizes a result of Kaparnov who considered the case of the curve P^1.