

## a) Research Programme/Projects

### 1) *Quantum integrability and Bethe ansatz solution for interacting matter-radiation systems*

This project is continued for investigating true rotational symmetry breaking for integrable matter-radiation models without rotating wave approximation.

Related studies is made in quantum algebra q-boson etc. The result is published.

*(This (in part ) is in collaboration with Hannover Group (Prof H Frahm), Germany )*

### 2) *Novel quantum generalization of Grassmann and quantum Plucker coordinates through Bethe ansatz*

This project is still under investigation. We are attempting to reformulate Bethe ansatz through a novel quantum generalization of Grassmann manifold and the exterior product. Due to this new formulation many interesting features of wave functions like Plucker relations etc are revealed.

*[This collaborative project (with Prof Yuji Kodama, Math. Dept. Ohio State Univ.) is under investigation*

### 3) *Novel concept of integrable mixed quantum systems*

This project is continued from last year. We are trying to tackle now the intriguing problem of formulating ( for the first time) sine-Gordon field model with defect as a quantum integrable model.

4) *Integrable hierarchy of higher NLS type eqns.* Based on my own earlier result and models (now known as *Kundu eqn. and Kundu-Eckhaus eqn.*, appeared several times in Title and abstract of other papers pursuing research on this model) a new integrable hierarchy is established with unusual balancing between higher nonlinearity but with low dispersive term.

The result is published.

## b) List of Scientific Publications

### 1. Anjan Kundu,

*Integrable hierarchy of higher nonlinear Schrödinger type equations* SIGMA 2 (2006), 078, 12 pages;

### 2. K. Chandrasekar, M. Senthilvelan Anjan Kundu and M. Lakshmanan, J Phys A, 39 (2006)9743-54 (10945-Erratum)

*A nonlocal connection between certain linear and nonlinear differential equations/oscillators*

### 3. Anjan Kundu, Phys. Lett B 633 (2006) 657-63

*Unifying quantization for inhomogeneous integrable models*

### 4. A. Kundu, Phys. Lett A 350 (2006) 210-3

*Integrable multi atom matter-radiation models without rotating wave approximation*