

Theory of integrable systems.
Italy - Russia collaboration.

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Round Table Italy - Russia & Dubna

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Solitons

Experiment - 1838 - J.S. Russell.

Equation - 1895 - Korteweg & de Vries.

$$\frac{\partial u}{\partial t} + \frac{\partial^3 u}{\partial x^3} + u \frac{\partial u}{\partial x} = 0.$$

Plasma physics - 1963 - Kruskal & Zabusky

Theory of solitons - 1967

Inverse scattering transform method -
- Gardner, Greene, Kruskal, Miura.

Basic idea - the use of Schrödinger equation

$$\frac{\partial^2 \psi}{\partial x^2} + u(x,t) \psi = E \psi.$$

Development:

1. Russia (USSR) -

- Zakharov, Shabat, Faddeev, Novikov,
Gelfand, Manakov, V. Matveev, Dubrovin, ..

2. USA -

Lax, Ablowitz, Newell, ...

3. Italy -

- F. Calogero (Rome), F. Magri (Milan),
Degasperis, Raghuco, Levi, Santini (Rome),
Boiti, Soliani, (Lecce), ...

4. Japan, UK, Germany, France, Spain, ...

Nowdays:

Theory of solitons (integrable system).

Pure mathematics — technology
(algebraic geometry) (fibre optics).

In physics
theories of gravity, strings — hydrodynamics.

Very wide and active field of research.

International collaborations.

Italy - Russia (USSR). ^{4.}

End of seventies -
conferences, workshops, visits,

NEEDS workshop (F. Calogero).

Workshops in Lecce (Boiti, Penzinielli,
Soliani)

Collaborations:

1. Rome Universities (La Sapienza, Roma 2)
(F. Calogero, Degasperis, Santini,
Ragnisco, Levi, ...)

- Landau Institute for Theoretical Physics
Institute for Theoretical and Experimental
Physics (Moscow)

Lebedev Physical Institute (Moscow),

MIAN, POMI,

Ufa, Novosibirsk, ...

(Shabat, Manakov, Grinevich, Marshakov,
Zakharov, Mikhailov, Savelov, Olshanskii, Perelomov, ...)

2. University of Lecce

(Boiti, Pempinelli, Soliani, Martina
Koumelchenko (before 1993 - Institute
of Nuclear Physics, Novosibirsk).

- Landau Institute for Theoretical Physics,
Sterlov Mathematical Institute,

Lebedev Physical Institute, ... YINR, ...

Nizhni Novgorod, Novosibirsk, ..

(Pogrebrov, Bogdanov, Taimanov,
Protogerov, ...).

3. University of Naples, .. (G. Maruo)

4. University of Milano, ... (F. Magri).

5. SISSA (Trieste) - YINR (L. Bonora - A. Sorci
...
in mathematics

6. SISSA - (presentation of B. Dubrovnik)

7. University of ~~Balerno~~ Salerno.

Very active and fruitful collaboration!

In last 25 years ~ 150 publications
(research articles in international journals)

Lecce:

- Boiti's Perrinelli - Pogreben (MIAN) - 28
- Konopelchenko - Bogdanov (Landau) - 17
- Martina - Pashkev (YINR) - 13
- ...

Rome:

- Santini - Manakov (Landau) - 10
- Calogero - Perelomov (ITEP) - 6
- Levi - Yamilov (Ufa) - 7
- ...

Trieste:

Bokora - Sorin (YINR) - 8

Naples:

Marmo - V. Man'ko (FIAN) - 39

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Joint Italy-Russia
publications in
the theory of integrable
systems and related
subjects

> 200

One of the most successful
international collaboration
in fundamental research!

Necessary to continue
and develop!

In Lecce - great help from
(not money)

Consorzio EINSTEIN

(presentation by M. Boiti).