

QThG34 UNIVERSITY OF ZAGREB, DEPARTMENT OF MATHEMATICS, CROATIA

Prof. Mladen Pavičić, GF, Kačićeva 26, Pošt. pret. 217, HR-10001 Zagreb, Croatia.

Tel. +385-1-528348; Fax: +385-1-416621

E-mail: mpavicic@dominis.phy.hr

A contribution to *EXEC '96 Hamburg*, September 8–13, 1996

## NONMAXIMAL ENTANGLEMENT PREPARATION

Mladen Pavičić

### SUMMARY

A four photon experiment which prepares two independent photons in *pure* nonmaximal singlet- and triplet-like states is proposed. Two photons from two *input* photon singlets (generated by nonlinear type-II crystals) interfere in the fourth order at an asymmetrical beam splitter. Coincidental detections of those of them which emerge from different sides of the beam splitter—let us call them *preselector photons*—serve as a gate for a preselection of the other two unpolarized companion photons from the pairs—let us call them *Bell photons*—into a nonmaximal polarization correlated state. *Input* photon singlets are generated either by means of beam splitters fed from nonlinear crystals of type-II with tangent signal and idler cones or by means of single nonlinear crystals of type-II with intersecting signal and idler cones. Such setups can be used for closing all the remaining loopholes in the Bell theorem with detection efficiency of *preselector photons* being arbitrarily low and with detection efficiency of *Bell photons* being as low as 67%. The setups can also be used for preparing nonmaximal entangled states without losing counts as opposed to the attenuation method. On the other hand, the setups with a symmetric beam splitter and without polarizers behind it can be used for a preparation of spin-correlated states of photons in the spin space by means of controlling other than spin observables.

### REFERENCES

- Pavičić, M., Spin-correlated interferometry for polarized and unpolarized photons on a beam splitter, *Physical Review A*, **50**, 3486-3491 (1994).  
Pavičić, M., Spin correlated interferometry with beam splitters: preselection of spin correlated photons, *Journal of the Optical Society of America B*, **12**, 821-828 (1995).

# CLEO®/EUROPE-EQEC'96 COMMITTEES

## EQEC COMMITTEES

### ORGANISING COMMITTEE

#### General Chairs:

Elisabeth Giacobino, *Université Pierre et Marie Curie, Paris, France*  
Ove Poulsen, *Ministry of Research, Copenhagen, Denmark*

#### Programme Chairs:

Wolfgang Ertmer, *Universität Hannover, Germany*  
Sune Svanberg, *Lund Institute of Technology, Sweden*

#### Local Organising Committee:

Jörg Müller, *TU Hamburg-Harburg, Germany*  
Klaus Petermann, *Universität Hamburg, Germany*  
Herbert Welling, *Universität Hannover, Germany*  
Hermann Harde, *Universität der Bundeswehr, Hamburg, Germany*  
Günter Huber, *Universität Hamburg, Germany*  
Hinrich Martinen, *Rofin-Sinar Laser GmbH, Hamburg, Germany*

## EQEC PROGRAMME COMMITTEE

### 1. Spectroscopy

**Chair:** W. Hogervorst, *Vrije Universiteit, Amsterdam, The Netherlands*  
S.N. Bagayev, *Institute of Laser Physics, Novosibirsk, Russia*  
J. Campos, *Universidad Complutense de Madrid, Spain*  
K. Ernst, *Warsaw University, Poland*  
R. Hallin, *Uppsala University, Sweden*  
M. Inguscio, *Università di Firenze, Italy*  
C. Salomon, *Université Pierre et Marie Curie, Paris, France*  
R. Thompson, *Imperial College, London, UK*  
L. Windholz, *Technische Universität Graz, Austria*  
C. Zimmermann, *Ludwig-Maximilians-Universität, München, Germany*

### 2. Nonlinear Optical Phenomena

**Chair:** G. Grynberg, *Université Pierre et Marie Curie, Paris, France*  
T. Erneux, *Université Libre de Bruxelles, Belgium*  
P. Glorieux, *Université des Sciences et Technologies de Lille, France*  
O. Kocharovskaya, *Academy of Sciences, Nizhny Novgorod, Russia*  
F. Mitschke, *Universität Münster, Germany*  
G.L. Oppo, *University of Strathclyde, Glasgow, UK*  
Y. Prior, *Weizmann Institute of Science, Rehovot, Israel*  
M. Tamburini, *Fondazione Ugo Bordini, Roma, Italy*  
R. Vilaseca, *Universidad Politécnica de Catalunya, Terrassa, Spain*

### 3. Quantum Optics

**Chair:** L. Lugiato, *Università di Milano, Italy*  
V. Buzek, *Slovak Academy of Sciences, Bratislava, Slovakia*  
C. Fabre, *Université Pierre et Marie Curie, Paris, France*  
P.L. Knight, *Imperial College, London, UK*  
J.-M. Raimond, *Ecole Normale Supérieure, Paris, France*  
K. Rzadzewski, *Polish Academy of Sciences, Warsaw, Poland*  
W. Schleich, *Universität Ulm, Germany*  
P. Toschek, *Universität Hamburg, Germany*

### 4. Optical Interactions with Condensed Matter

**Chair:** G. Gerber, *Universität Würzburg, Germany*  
K. Duppen, *University of Groningen, The Netherlands*  
J. Feldmann, *Universität Marburg, Germany*

R. Höpfel, *Universität Innsbruck, Austria*  
N. Koroteev, *Moscow State University, Russia*  
N. Kroo, *Hungarian Academy of Sciences, Budapest, Hungary*  
J. Kuhl, *Max-Planck-Institut, Stuttgart, Germany*  
J.L. Oudar, *CNET, Bagneaux, France*

### 5. Physics of Coherent Light Sources

**Chair:** R.G. Harrison, *Heriot-Watt University, Edinburgh, UK*  
W. van Amersfoort, *FOM-Instituut voor Plasmafysica, Nieuwegein, The Netherlands*  
V.I. Kovalev, *Lebedev Physics Institute, Moscow, Russia*  
W. Lange, *Universität Münster, Germany*  
M.R. Siegrist, *Centre de Recherche en Physique des Plasmas, Lausanne, Switzerland*  
B. Sinclair, *University of St. Andrews, Fife, Scotland, UK*  
F. Stoeckel, *Universität Joseph Fourier, St. Martin D'Hieres, France*  
G. Tino, *Università di Napoli, Italy*  
B. Welleghausen, *Universität Hannover, Germany*

### 6. Ultrafast Phenomena

**Chair:** U. Keller, *ETH, Zürich, Switzerland*  
S. De Silvestri, *Politecnico di Milano, Italy*  
T. Elsaesser, *Max-Born-Institut, Berlin, Germany*  
A. Migus, *Ecole Polytechnique, Palaiseau, France*  
A. Miller, *University of St. Andrews, Fife, Scotland, UK*  
A. Piskarskas, *Vilnius University, Lithuania*  
A.J. Schmidt, *Technische Universität Wien, Austria*  
D.M. Wiersma, *University of Groningen, The Netherlands*

### 7. Lasers in Chemistry, Biology and Medicine

**Chair:** V. Sundström, *Lund University, Sweden*  
T. Aartsma, *Leiden University, The Netherlands*  
E. Arimondo, *Università di Pisa, Italy*  
J. Korppi-Tommola, *University of Jyväskylä, Finland*  
J.C. Mialocq, *Commissariat à l'Energie Atomique, Gif-Sur-Yvette, France*  
A. Oraevsky, *Lebedev Physical Institute, Moscow, Russia*  
J. Schröder, *Universität Göttingen, Germany*  
M.W. Sigrist, *ETH, Zürich, Switzerland*  
L. Valkunas, *Lithuanian Academy of Sciences, Vilnius, Lithuania*  
R. Wilbrandt, *Risø National Laboratory, Roskilde, Denmark*