EUROPEAN
PLASMA RESEARCH
ACCELERATOR WITH
EXCELLENCE IN
APPLICATIONS

EuPRAXIA

Welcome back!

Massimo Ferrario (INFN-LNF)

on behalf of the EuPRAXIA Collaboration

EuPRAXIA_Workshop, September 22

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EuPRAXIA Workshop

23-27 September 2024

Elba

- EuPRAXIA PP Annual Meeting [P. Campana, M. Ferrario] (23-24-25)
- **M15.2** Workshop on "EuPRAXIA@SPARC_LAB machine upgrade and additional beam lines" [C. Vaccarezza, Pompili] (26)
- **M6.1** Outreach Workshop [B. Cros, A. Mostacci] (27)

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Sunday 22 Arrivals		Monday 23 EuPRAXIA_PP		Tuesday 24 EuPRAXIA_PP		Wednesday 25 EuPRAXIA_PP		Thursday 26 WORKSHOP		Friday 27 WORKSHOP	
											Presentation of EuPRAXIA
		09:00	Welcome	09:	Overview of Plasma based Linear Collider efforts (J. Osterhoff)	09:00	Dielectric wakefield acceleration: application t linear colliders (J. Rosenzweig)	09:00	EuPRAXIA@SPARC_LAB status short (R. Pompili - C. Vaccarezza)	9:00	EuPRAXIA accelerator and facility: a technical perspective (M. Ferrario)
		09:10	Opening talk: Recoil dominated electron-photon beam collisions... (L. Serafini)					09:10	Beam Driven Acceleration Scheme to 5 GeV Energy for EuPRAXIA@SPARC_LAB (A. Giribono)	9:30	EuPRAXIA Collaboration and its organisation (A. Falone)
		10:00	EuPraxia Status (P. Campana - M. Ferrario)	09:50	WP7 E-Needs and Data Policy (R. Fonseca - S. Pioli)	09:50	WP13 Diagnostics (A. Cianchi - R. Ischebeck)	09:40	EuPRAXIA@SPARC_LAB energy boosting to 5 GeV by LWFA and external injection (A.R. Rossi)	9:45	Reason and directions of Membership Extensions (P. Campana)
								10:10	Plasma-Based Solutions for Beam Handling and Driver Extraction (M. Carillo)	Potential links in countries not yet represented in EuPRAXIA	
		10:40	Coffee Break	10:40	Coffee Break	10:40	Coffee Break	10:40	Coffee Break	0:00 0:30	Pioneering experience on the development of accelerators from scratch: SESAME facility (A. Lausi)
		11:00	WP2 Dissemination and Public Relations (C. Welsch - S. Bertelli)	11:00	WP8 Theory & Simulation (J. Vieira - H. Vincenti)	11:00	WP14 Transformative Innovation Paths (B. Hidding - S. Karsch)	11:00	Stable Beam driven wakefield in structured plasmas (A. Pukhov)	0:40	Coffee Break
		11:50	WP3 Organization and Rules (A. Specka - A. Ghigo)	11:50	WP9 RF, Magnets & Beamline Components (S. Antipov - F. Nguyen)	11:50	WP15 TDR EuPRAXIA @SPARC_LAB (beam-driven plasma) (C. Vaccarezza - R. Pompili)	11:30	Towards 400 Hz RF system for EuPRAXIA@SPARC_LAB (F. Cardelli)	1:00	Research initiatives in INDIA and potential opportunities for EuPRAXIA (R. Pattathil)
		12:40	Lunch	12:40	Lunch	12:40	Lunch	12:00 12:30	High repetition rate C-band Photoinjector (G. Silvi)	1:30	Research initiatives in AFRICA and potential opportunities for EuPRAXIA (C. Darve)
								12:40	Lunch	2:00 2:30	The Latin American Synchrotron in the Greater Caribbean (G. Violini)
		16:00	Coffee Break	16:00	Coffee Break	16:00	Coffee Break			2:40	Lunch
		16:20	WP4 Legal Framework, Financial Model and Socio-economic impact (A. Falone)	16:20	WP10 Plasma Components & Systems (K. Cassou - R. Shalloo)	16:20	WP16 TDR EuPRAXIA Site 2 (laser-driven plasma) (A. Molodozhentsev - R. Pattathil)				EuPRAXIA framework for R&D
16:00	Arrivals	17:10	WP5 User Strategy and Services (F. Stellato - E. Principi)	17:10	WP11 Applications (G. Sarri - E. Chiadroni)	17:10	Beyond EuPRAXIA_PP: the PACRI Project (G. D'Auria)	16:00	High Repetition rate Plasma sources (L. Crincoli)	6:00	Plasma based positron sources for testing positron acceleration at EuPRAXIA (G. Sarri)
						17:40	Final Discussion	16:30	Fully synchronized high repetition rate Petawatt laser driver for betatron beamline on EuPRAXIA@SparcLab machine (A. Courjaud)	6:25	Synergies for laser development between EuPRAXIA and other fields including fusion and industry (L. Gizzi)
										6:50	Nuclear physics in plasma at EuPRAXIA (P. Tomassini)
								17:00	Ultracold electron sources, kHz plasma injectors and strong THz fields (S. Karsch)	7:15	EuPRAXIA possible contributions to the Linear Collider development (J. Osterhoff)
								17:30	Coffee Break	7:40	Coffee Break
											Training and young researcher education
19:00 - 20:30	Welcome Cocktail	18:00	WP6 Membership Extension Strategy (B. Cros - A. Mostacci)	18:00	WP12 Laser Technology and Liaison to Industry (L. Gizzi - P. Crump)	18:00 - 19:30	Collaboration Board	18:00	VUV Applications at EuPRAXIA@SPARC_LAB (F. Stellato)	8:00	The African School of Physics (K. Adikle Assamagan)
								18:30	Theory and simulations for high K/γ regimes in undulator and ion channel devices (A. Frazzitta)	8:20	Tools for Students training in EU and funding opportunities (C. Welsch)
		18:50 - 19:30	General Discussion	18:50 - 19:30	General Discussion						Discussion/Round table
								19:00 - 19:30	Closing Remarks & Discussion (R. Pompili - C. Vaccarezza)	8:40 - 9:30	Strategy for linking Eupraxia to other worldwide similar accelerator activities convener: B. Cros (K. Adikle Assamagan - C. Darve - A. Lausi - M. Ferrario - R. Pattathil - G. Violini)
20:30	Dinner	20:30	Dinner	20:00	Dinner	:30	Social Dinner	20:30	Dinner	0:30	Aperitivo Dinner
				21:30 - 22:30	Hollywood Physics (C. Welsch)						

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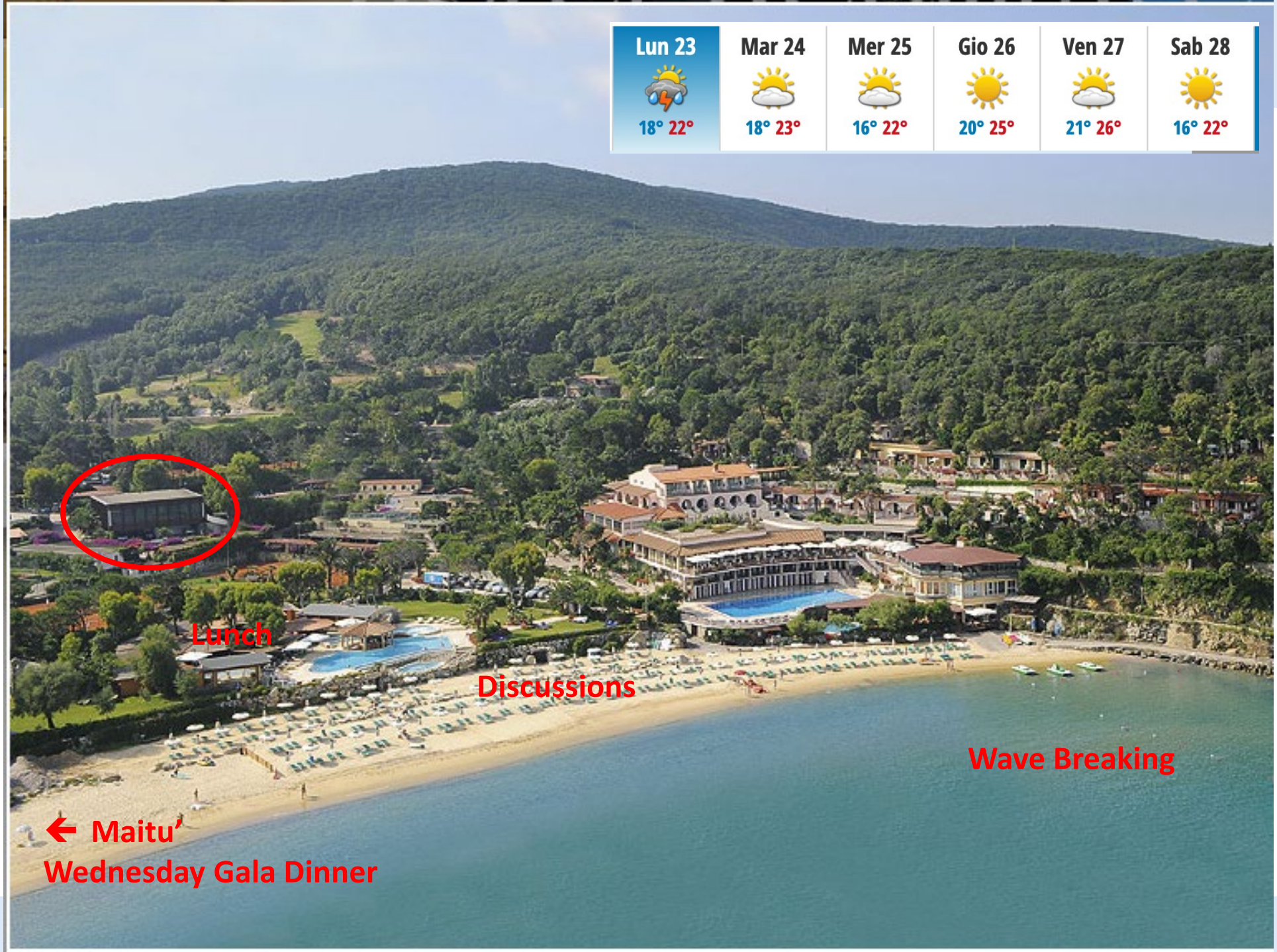

Opening talk: Recoil dominated electron-photon beam collisions, a way towards novel radiation sources, advanced secondary beams and new phenomena in astrophysics

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Recoil dominated electron-photon beam collisions, a way towards novel radiation sources, advanced secondary beams and new phenomena in astrophysics.
L. Serafini & V. Petrillo (INFN-Milano and University of Milano)

Abstract: Revisiting 100 years of Compton scattering, with emphasis on deep recoil regime of electron-photon collisions, spanning the full kinematics range from direct Compton effect of photons on targets to inverse Compton scattering of relativistic electrons with photon beams, let us discover some new effects of entropy exchange between the colliding beams. These phenomena have great potentialities for applications in several fields: from spectral purification effects that can be exploited for compact & sustainable mono-chromatic gamma ray sources, to plasma heating by trapped electrons in magnetic bottles, from advanced secondary beam production (positrons, muons) with very small emittance, to exotic effects of stopping ultra-high energy electrons with 255.5 keV X-rays, that may have impacts in the astro-physical field. Advanced plasma based GeV-class electron accelerators may represent the natural cradle for test experiments of deep recoil electron-photon interactions due to their compactness, versatility and flexibility to arrange beam-lines within a multi-faceted lay-out of electron beams and radiation of diverse nature (lasers, FELs, betatron beams, ICS X-rays, channeling radiation beams). Last but not least, exploring the deep recoil regime fundamental investigations of QED interactions may become feasible in dynamical ranges never explored before.