***Main topic (for Opening Lecture and Industrial Workshop):***
***"Plasma technology for new energy concepts"***

### *1 Plasma and ion surface engineering*

- **Plasma and ion source technologies**
  - New ion and plasma sources
  - Pulsed plasmas including HiPIMS and pulsed Arc
  - Industrial source technology
- **Plasmas in liquids**
- **Plasma assisted synthesis**
- **Atmospheric plasmas**
  - Arcjet and torch plasmas
  - Coronas
  - Dielectric barrier discharge
  - Microplasmas
- **Particles and powders in plasmas**
  - Particle load control and avoidance
  - Nanoparticle synthesis
  - Particle treatment and functional nanoparticles

### *2 Surface modification technologies*

- **Plasma diffusion technologies**
- **Plasma treatment, cleaning and etching**
  - Principles of plasma surface interaction
  - Surface cleaning and functionalization by plasma and radiation (UV, Laser)
  - Effects on adhesion and bonding
  - Plasma etching, pattern transfer and related effects
- **Physical vapor deposition - PVD**
  - Magnetron sputter deposition
  - Vacuum arc deposition
  - Plasma-activated evaporation
- (**Plasma-enhanced) Chemical vapor deposition – (PE)CVD**
  - Low pressure and atmospheric plasma CVD
  - Plasma polymerization
  - Atomic layer deposition ALD
- **Other plasma based surface processing technologies**
  - Ion beam deposition and ion beam etching
  - Ion and plasma immersion implantation
  - Hybrid processes

### *3 Coating applications and properties*

- **Protective and tribological coatings**
  - Effects on standard tribological coatings
  - Carbon based hard coatings
  - Corrosion resistant coatings
  - Large area scratch resistant coatings
  - Barrier coatings for sensitive devices

- **Optical coatings**
  - Multilayer coatings from EUV to IR
  - Interface and barrier engineering
  - End point detection methods
- **Electrical and magnetic coatings**
  - Electrical isolation coatings
  - Electrical contact coatings including conductive and photocatalytic oxides
  - Sensors based on electrical effects
  - Electrochromic and thermochromic coatings
  - Magnetic coatings including magnetic multilayers
  - Piezoelectric films for frequency filters and ultrasonic applications
  - Structuring of electrical and magnetic coatings and related effects
- **Biomedical & biological applications**
  - Agriculture
  - Biocompatible and biodegradable coatings
  - Biofunctionalization of surfaces
  - Plasma activated media
  - Plasmamedicine
- **Energy conversion related coatings**
  - Coatings for photovoltaics and new cell concepts
  - Piezoelectric and thermoelectric films for energy harvesting
  - Films for batteries and supercapacitors
  - Coatings for fuel cell applications
  - Hydrogen generation
- **Quantum technologies**

***4 Characterization and simulation of films and processes***

- **Simulation and modelling of growth, structure and properties**
- **Simulation of plasma processes**
- **Properties of technological plasmas**
  - Plasma diagnostics and related process control
  - Plasma modelling
- **Analytics of film structures & properties**
  - Chemical and crystal composition
  - Geometrical and mechanical characterization (thickness, roughness, stress)
  - Optical properties
  - Electric and magnetic properties
- **Methods of in-situ process diagnostics**
  - In-situ control and adjustment of film properties
  - Process end-point detection