







<p>Date: 12.02.2021 Authorized user: Dr. Simone Ferrari, Fabian Beutel Work area: E-Beam Zone Workplace: Room E.06, E.09</p>	<h2 style="margin: 0;">Safety Instruction</h2> <h1 style="margin: 0;">Electron Beam Lithography System</h1> <h2 style="margin: 0;">Raith EBPG 5150</h2>	<p>WWU Münster Nanofabrication Facility (MNF) CeNTech - Center for Nanotechnology - Heisenbergstr., 11 - 48149 Münster</p>
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Range of Application		
Electron Beam Lithography		
Hazard for People and the environment		
	<ul style="list-style-type: none"> High voltages: only appropriately trained personnel should access the system electronics or high voltages supplies Strong magnetic field intensities are emitted. Personnel may be injured, or equipment may be damaged by magnetizable tools or objects, which may be attracted toward a component of the system. Ionizing radiation: X-rays are generated in the column and specimen chamber. Any modification of the system may reduce the radiation shielding. Crush Hazard: Care is required when opening or moving access doors, loadlock and system panels to prevent risk of crush injuries. Trip Hazard: Obstacles at floor level, such as cables and pipes may present a trip hazard. Heavy objects: Appropriate lifting equipment may be necessary. Slip Hazard: Spillages of lubricants or other fluids on floors or other surface on which personnel may need to stand, may present a slip hazard. Presence of cooling agents may cause the risk of cold burns or frostbite in presence of leaks. Flammable liquid and volatile substances are used during maintenance and operation. Avoid contact with hot surfaces and keep away from naked flames. Store in a suitable flammables' cupboard, away from oxidizing agents. Contact exposure with either a gaseous, liquid or solid irritant, harmful or corrosive substance can cause permanent damage to human tissues, such as skin, eyes or respiratory system or immediate and serious potentially fatal toxic and harmful effects. Class 2 lasers are present in the system. Eye injury may be caused by direct laser exposure to the eye when the column is lifted or the sample chamber is opened. Avoid eye exposure to direct scattered radiation. 	

Safety Measures and Rules of Behavior		
	<ul style="list-style-type: none"> Operating the machine is only allowed to authorized and trained personnel with knowledge of the operation procedures as well as the safety data sheets of the system. Access in the E-Beam area is allowed only to personnel which attended the regular cleanroom safety and behavior training. Persons wearing a cardiac pacemaker or metallic implants must take themselves aware of the potential for magnetic field intensities emitted. Operating the system with all panels and doors in place ensures that all personnel are at safe working distance. Adequate personal protective equipment must be worn. Earth grounding provides protection from injury to system operators and personnel in the working area. Follow all safety notes and hazard warnings provided and information on the system manual and MSDS sheets. Make use of the occupational health care. <p>In case of any unclear issues contact the responsible person Prof. Dr. Wolfram Pernice.</p>	
Action in Failure		
	<ul style="list-style-type: none"> In case of any malfunction or inform the instrument manager and your direct supervisor. Instrument is only to be switched off by a designated person (Dr. Simone Ferrari 34456, Fabian Beutel 63916) 	
Action in Accident, First Aid		
	<ul style="list-style-type: none"> Protect yourself and remove injured people out of the danger area, react quickly, involve primary responsible person Firefighting only with CO₂ fire extinguisher In case of exposure to radiation or hazardous substances, consult immediately a doctor. In case of severe injuries call an emergency doctor (phone 112). Immediately treat small injuries. A first aid kit is provided in the vicinity of the operator PC. Enter data in the accident book. Report any accident to the appointed first aider, the instrument manager and your direct supervisor. 	
Maintenance and Disposal		
	<ul style="list-style-type: none"> Maintenance work may only be carried out by qualified and instructed staff. Lockout/tag out procedures must be followed to any electronic device or high voltage supply before maintenance. Switch off power before servicing the column. Refer to the system manual for detailed information regarding maintenance procedures and components disposal. 	
Consequences in Nonobservance		
	<ul style="list-style-type: none"> Sever injury or death Costly damage to the instrument Malfunction 	