

Risk Assessment Form

Title of Risk Assessment Risk Assessment for use of Superconductivity and Magnetism Group Labs.

Date of assessment 31/01/24

Department Physics

Date review due Continuous

Description of Task/Process General risk assessment for the work relating to visiting research project of Jacob Svane.

Assessment carried out by Jacob Svane

Additional information Other users of the Superconductivity and Magnetism Group Labs are affected by this risk assessment.

| <u>Hazards and how they may cause harm</u> | <u>Who may be at Risk?</u> | <u>Existing Control Measures</u> | <u>Current Risk Level</u> (VL,L,M,H,VH) | <u>Where current risk is M, H or VH, what additional Control Measures are required?</u> | <u>Action required by whom & by when?</u> | <u>Final Risk Level</u> |
|--|--|--|--|---|---|-------------------------|
| Use of Rooms – Cuts from broken glassware. | The glassware user and others present in the laboratory. | Wear PPE including safety glasses, lab coat and gloves when handling chemicals and glassware. Dispose of any broken glassware by putting it in the specified bins. | VL | N/A | N/A | VL |
| Use of Rooms – Burns or electrocution from mains electricity or wires. | All users of the laboratories. | Do not tamper with the apparatus in the room. | H | Perform regular checks on circuitry and apparatus. | N/A | L |
| Use of Rooms – Chemical hazards from handling chemicals, particularly poisoning from harmful chemicals. | All users of chemicals in the laboratories. | Wear PPE including gloves. Consult relevant COSHH documents (Control of Substances Hazardous to Health) to be aware of potential hazards. Wash hands after handling chemicals. | M | Carefully reading of the Safety Data Sheet for each element required (VO ₂ , V ₂ O ₅). | N/A | L |
| Use of Rooms – Eye or skin irritation or poisoning from chemical residues in dirty glassware | All users of chemicals in the laboratories. | Wear PPE including gloves and eyewear. Clean glassware with isopropanol and acetone before and after use. | VL | N/A | N/A | VL |
| Use of chemical solvents – irritation to skin or eyes. | User | Use PPE. Try to avoid direct contact with skin | L | Any spills must be correctly cleaned, and major spills require department to be notified. All solvents to be correctly disposed of. | | VL |

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|---|--|--|--|---|------------------------------------|-------------------------|
| Use of Rooms – Exposure to chemical fumes | All users of the laboratories. | Wear PPE including gloves. Consult COSHH to be aware of potential hazards and use a fume cupboard where appropriate. | L | N/A | N/A | L |
| Use of Rooms – Wet floors leading to a trip hazard | All users of the laboratories. | Be aware of and remove potential hazards if possible. Dry the floor if wet. | VL | N/A | N/A | VL |
| Use of Rooms – Obstructed walkways leading to a trip hazard | All users of the laboratories. | Be aware and remove potentials hazards if possible. Do not block the walkways. | VL | N/A | N/A | VL |
| Use of Rooms – Going up and down stairs leading to a potential fall | All users of the laboratories. | Be aware of a potential hazard. Be careful when using the stairs. | VL | N/A | N/A | VL |
| Use of Rooms – Cables on the floor leading to a trip hazard | All users of the laboratories. | Be aware of a potential hazard. Do not step on the cables. | VL | N/A | N/A | VL |
| Use of Rooms and High Vacuum Furnace – Chemical hazards from escaped chemical gases, such as asphyxiation or poisoning | The high vacuum furnace user and others present in the laboratory. | Do not tamper with the gas ventilation systems. Indicate on the furnace user sheet the nature of the samples. Be aware of hazards from other samples placed in other furnaces. | L | N/A | N/A | L |

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|---|---|--|--|--|---|-------------------------|
| Use of box furnaces and tube furnaces – Hot surfaces, explosion of vacuum/pressure systems, dangerous fumes, cuts from broken glass and sharp metallic wire. | All personnel in lab environment | Wear appropriate PPE. Ensure pressure gauges read safe pressures. Do not touch surfaces when furnace in use. Do Ensure sealed quartz tubes are not over pressurised. Ensure adequate ventilation when there is a risk of dangerous fumes. Dispose of sharps and broken glass in approved bin. Do not modify gas ventilation systems. | L | | | L |
| Use of instruments involving X-ray generation (Ionising radiation source) – possible radiation burns or cellular damage | User of instrument, and other personnel present while radiation source is in use. | Diffraction meters are located in designated X-ray areas and are commercial controlled setups including interlocking doors and shields to prevent radiation exposure the surroundings, coupled with warning systems to indicate source is in use. Only to be used following proper training. | M | Ionising radiation safety course and training on individual instruments to be completed. | User of instrument, and other personnel present while radiation source is in use. | VL |
| Arc Furnace – looking directly at the electrical arc can cause damage to eyes from burning to blindness | The arc furnace user and others present in the laboratory. | A welding shield is fitted in front of the furnace when in use to protect the user, and there is a curtain surrounding the area to protect others. | VH | Training is required for use. A user manual will be followed when used. | Training required before starting. | L |

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|---|--|--|--|--|------------------------------------|-------------------------|
| Arc Furnace – risk of fire/explosion if exposed to oxygen rich atmosphere if opened too early. | The arc furnace user and others present in the laboratory. | Ensure equipment and sample is sufficiently cooled before opening. | M | Training is required for use. A user manual will be followed when used. | Training required before starting. | VL |
| Arc Furnace – high pressure argon gas is used to produce an inert atmosphere | The arc furnace user and others present in the laboratory. | Make sure all of the transport tubes are working and sealed properly. | M | Training is required for use. A user manual will be followed when used. | Training required before starting. | VL |
| Arc Furnace – pump creates a vacuum in the sample chamber which puts pressure on the quartz window | The arc furnace user and others present in the laboratory. | Check there are no cracks in the quartz window before turning the pump on. Wear PPE. | M | Training is required for use. A user manual will be followed when used. | Training required before starting. | VL |
| Low Speed Diamond Saw – cut injury from the diamond blade | The diamond saw user. | Use the guard provided. Avoid distractions and ask if unsure. | L | Training is required for use. | Training required before starting. | VL |
| Low Speed Diamond Saw – burns possible from melting the glue that holds the sample to the holder. | The diamond saw user. | Wear PPE. Avoid distractions and ask if unsure. | M | Training is required for use. | Training required before starting. | VL |

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|--|----------------------------------|--|--|---|------------------------------------|-------------------------|
| Spillages and trip hazards | All personnel in lab environment | Fluid spillages or trailing wiring etc may constitute slip or trip hazards. Labs to be kept tidy and organised, and any spillages or mess to be cleared promptly. | L | | | L |
| Use of Cryogens: Filling nitrogen/helium dewar and transferring to instruments – Oxygen depletion and possible asphyxiation | All personnel in lab environment | Receive training before first use. Suitable ventilation is provided - asphyxiation hazard due to boiling cryogenic liquids. Dewars containing gases or cryogenic liquids are not to be accompanied in elevators. Oxygen monitors installed in laboratories | L | | | L |
| Use of Cryogens: Filling nitrogen/helium dewar and transferring to instruments – Possible contact with cold surface | User | Receive training before first use. Use all appropriate PPE (e.g. gloves). Avoid contact with cold gas, liquids or cold surfaces.. | L | | | L |

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|--|----------------------------|--|---|--|------------------------------------|-------------------------|
| Use of optical floating zone furnace – Hot surfaces, explosion of vacuum/pressure systems, dangerous fumes and intense UV/IR light. | User | Wear appropriate PPE. Do not touch surfaces when furnace in use. Do not look directly into the light in the furnace, always observe image on the TV/monitor screen. Do not open the furnace doors when in use and wait until the furnace is cooled down before removing sample. Ensure sealed quartz tubes are not over pressurised. | L | | | L |
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Work should not be carried out until the assessment is completed and all required control measures are in place.

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| Overall Final Risk Rating (Highest level in final column above) | L |
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| Additional Comments from Risk Assessor (e.g. funding or practical implications) | |
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University of Warwick Risk Assessment Form

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| Approved By | Geetha Balakrishnan |
| Date | 01/02-2024 |

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|----------|------------|
| Position | Supervisor |
|----------|------------|

Please print a copy, sign it and keep for your records

| | Severity | | | | |
|------------------|-------------|----------|-----------|-----------|-----------|
| Likelihood | Superficial | Minor | Serious | Major | Extreme |
| Unlikely | Very low | Very low | Low | Low | Moderate |
| Possible | Very low | Low | Low | Moderate | High |
| Likely | Low | Low | Moderate | High | Very high |
| Very likely | Low | Moderate | High | Very high | Very high |
| Extremely likely | Moderate | High | Very high | Very high | Very high |

| Risk Level | |
|------------|--|
| Very low | Acceptable risk - no action required |
| Low | Tolerable risk - further control measures not required, but status must be monitored |
| Moderate | Further control measures required to reduce risk as far as is reasonably practical |
| High | Urgent action required to allow activity to continue |
| Very high | Risk intolerable - activity must cease until the risk has been reduced |

See ['Matrix for risk evaluation'](#) for further guidance.