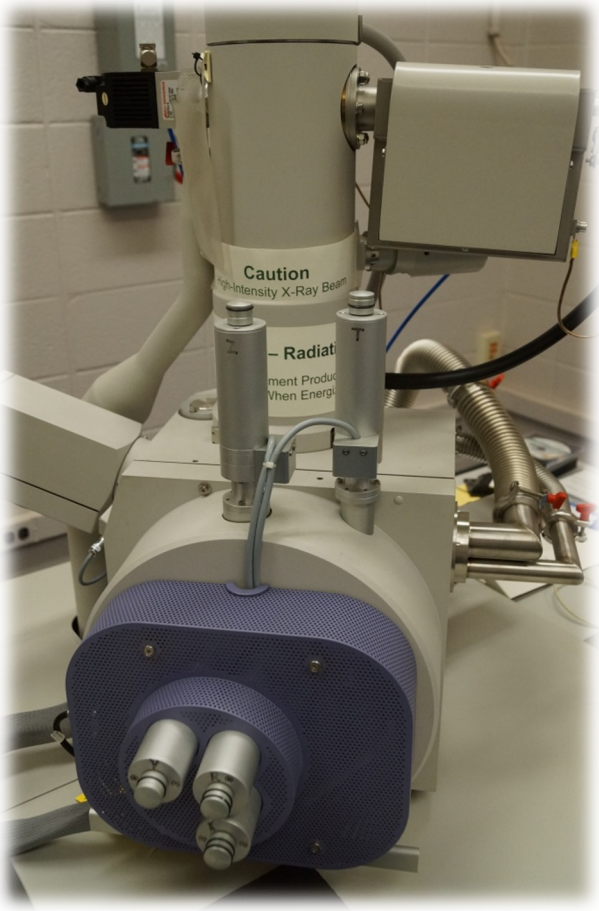
SCANNING ELECTRON MICROSCOPE (SEM)



Manufacturer:	FEI/Philips
Type/Model:	XL30 ESEM
SEM:	Tungsten thermal
Detectors:	SE and BSE
Resolution:	3.5 nm @ 30KV (High and Low Vac)
	<15nm @ 3KV (Low Vac)
Stage:	4-Axis motorized eucentric
	50x50 mm full travel
	-15 to 75 degree manual tilt
Vacuum:	Turbo pump with dual mechanical RP
	Low Vacuum capable

The XL-30 ESEM combines a high-brightness FEG source with a conventional electron column. Unlike conventional SEMs which require high vacuum in the specimen chamber, the microscope can be run in a "high-pressure" environmental mode allowing the examination of hydrated or insulating samples. This machine is capable of imaging almost any sample, with the only exceptions being volatile liquids, gases and samples that are too large. It is possible to image water and many other liquids by cooling them to a temperature where their vapor pressure becomes low enough to prevent unwanted evaporation at the chosen pressure of operation. (Liquids are seen as dark opaque shapes because the electrons do not penetrate through the liquid as light waves do through water.)

The unique conditions available with an ESEM make them useful for a large variety of experiments, not usually possible in an SEM. Imaging wet materials such as geological or biological material and non-conducting materials such as polymers and ceramics is possible. In addition, it is possible to heat it as high as 1500 C. Special stages can be constructed so that samples can be subjected to failure analysis; for example by using a strain stage to fracture materials. Such events can conveniently be recorded for repeated viewing and for timing purposes.

Because the water vapor acts to neutralize any charge buildup on the surface of the sample, almost no preparation is required. Thus it is possible to image corroded surfaces, paints and other synthetic finishes, glasses, ceramics, rocks, minerals, polymers and any other materials with low electrical conductivity, all without having to coat the samples with a conductive layer of gold or carbon. This means that everything is seen in its natural state.

Additionally this machine has a TSL electron backscatter pattern (EBSP) and phase identification system for determining the orientation of crystalline grains in a sample. The results from automatic stage or beam scanning are stored and may be displayed in a variety of different ways including colored maps and pole figures.