**Safety Procedure for**

# Tesla Coil

1. Always use procedure as listed below:
    a. When setting up coil, it is plugged into the variac. It is never plugged into the mains directly. When setting up, the variac is left unplugged from the mains power.
    b. The ground connection of the discharge rod is checked to be of low resistance with a multimeter every time the coil is set up to run, immediately before running. The safety lead is left on the terminals on the capacitor cart.
    c. All metal items are removed from the person who will be holding the discharge rod, including glasses, necklaces, etc.
    d. Audience members are warned to leave the room if they have a pacemaker, and to turn off mobile phones.
    e. Everyone except the person holding the discharge rod is moved to a distance of at least 5m away from the coil.
    f. The person who will be holding the discharge rod removes the safety lead from the terminals on the capacitor cart whilst holding the short, non-grounded discharge rod across the terminals.
    g. The discharge rod is held at least 30cm from the discharge point on the coil until it begins to spark.
    h. When all of the above points are satisfied, the person holding the discharge rod calls ‘ready’. Everyone else in the room must remain silent from this point.
    i. The ‘power person’ who is situated at least 5m away at the position where the coil is plugged into the variac (which is still unplugged from the mains power) calls the following as they check each to be true:
        i. “Variac at zero” (meaning set to zero volts).
        ii. “Variac off” (meaning variac power switch is set to ‘off’)
        iii. “Variac unplugged” (meaning the variac is not plugged into mains power).
        iv. “Power off at the wall” (meaning the power switch is turned off at the wall, where the variac is about to be plugged in).
    j. The person holding the discharge rod acknowledges that the procedure has been correctly followed and indicates that they are ready to proceed by calling ‘proceed’. The discharge rod is still held at 30cm from the discharge point on the coil.
    k. The ‘power person’ calls the following as they do each step:
        i. “Variac plugged in” (plugged into mains power socket)
        ii. “Power on at the wall”
        iii. “Variac on”
        iv. “Variac at zero”
    l. The ‘power person’ now begins to turn up the voltage on the variac very slowly, calling as the reach each 10V mark (for example: “10 volts, 20 volts…” etc.). If at any time anyone in the room calls ‘abort’, the power

person will drop the power on the variac to zero volts (over the period of approximately a second, calling the voltage as appropriate), turn of the variac, turn off the power at the wall and unplug the variac from the wall.

m. The ‘power person’ will continue to turn up the voltage on the variac until the coil sparks to the discharge rod, or until 180V is reached. If 180V is reached the procedure is as for a call of ‘abort’. If the coil sparks they will turn up the voltage a further 5V (as long as this remains less than 180V) to ensure a continuous spark, and allow it to run for approximately 30seconds, or until ‘abort’ is called. During this entire time the discharge rod will be held at or closer than 1m from the discharge point on the coil (once the coil begins to spark it may be moved further away than 30cm up to the limit of 1m).
n. The ‘power person’ will turn down the voltage on the variac until the coil ceases to spark, then slowly turn it down to zero, calling as each 20V mark is reached.
o. The ‘power person’ will call the following as doing each step:
    i. “Variac at zero”
    ii. “Variac off”
    iii. “Power off at the wall”
    iv. “Variac unplugged”
p. The person holding the discharge rod will then move the rod slowly towards the discharge point on the coil, and run the discharge rod against it. They will then put down the discharge rod and move towards the capacitor cart. Using the short, non-grounded rod and standing well clear they will put the ends of the rod across the terminal points; just before they touch them together they will call ‘discharge’. Holding the rod in place to connect the terminals they will put on the safety lead. The rod can then be removed.
q. The coil is now safe.

2. Always handle the coil with care and never run when it is being transported.
3. Always wear insulating (rubber soled) shoes.
4. Audience members will be restricted to an area further than 10m from the demonstration.