Demonstration of Stress Control Tubing

Annotations on the Video

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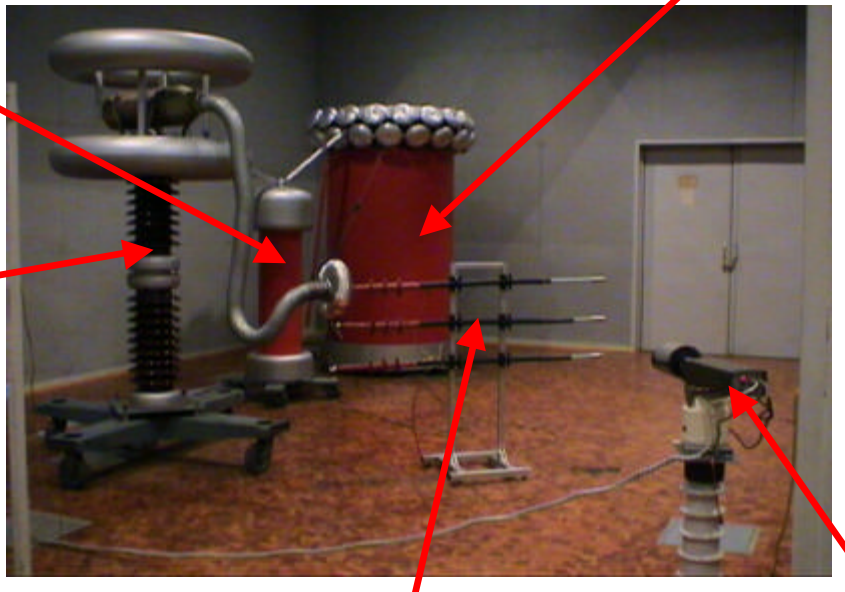
HV Lab Ottobrunn

Voltage Divider
(Measurement)

HV Transformer 350kV/1A



Partial Discharge
Measurement Unit

Terminations

Light Amplifying
TV Camera

Additional Capabilities: 400kV DC, 800kV Lightning Impulse,
Load Cycling up to 1000A, Step Test 200kV

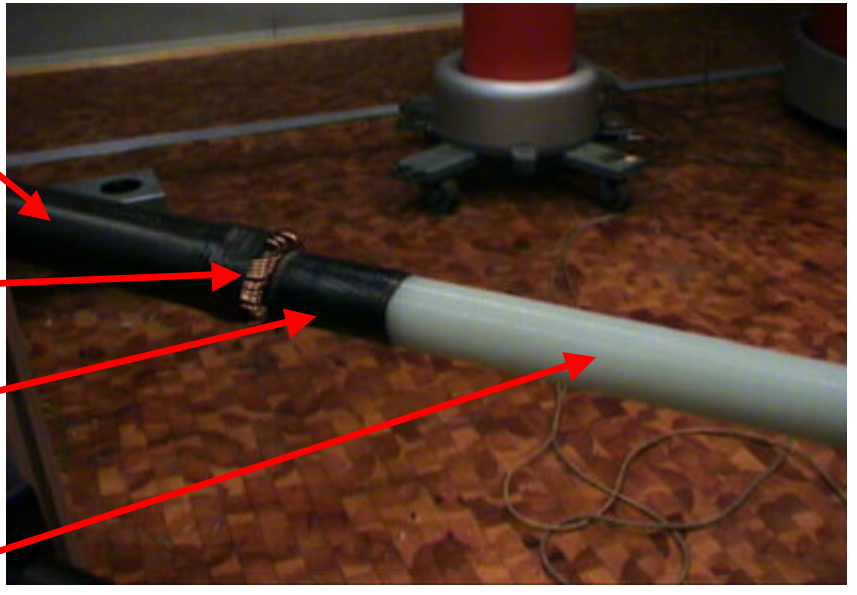
Bare Cable

Cable 24kV/150mm²

Screen Wires

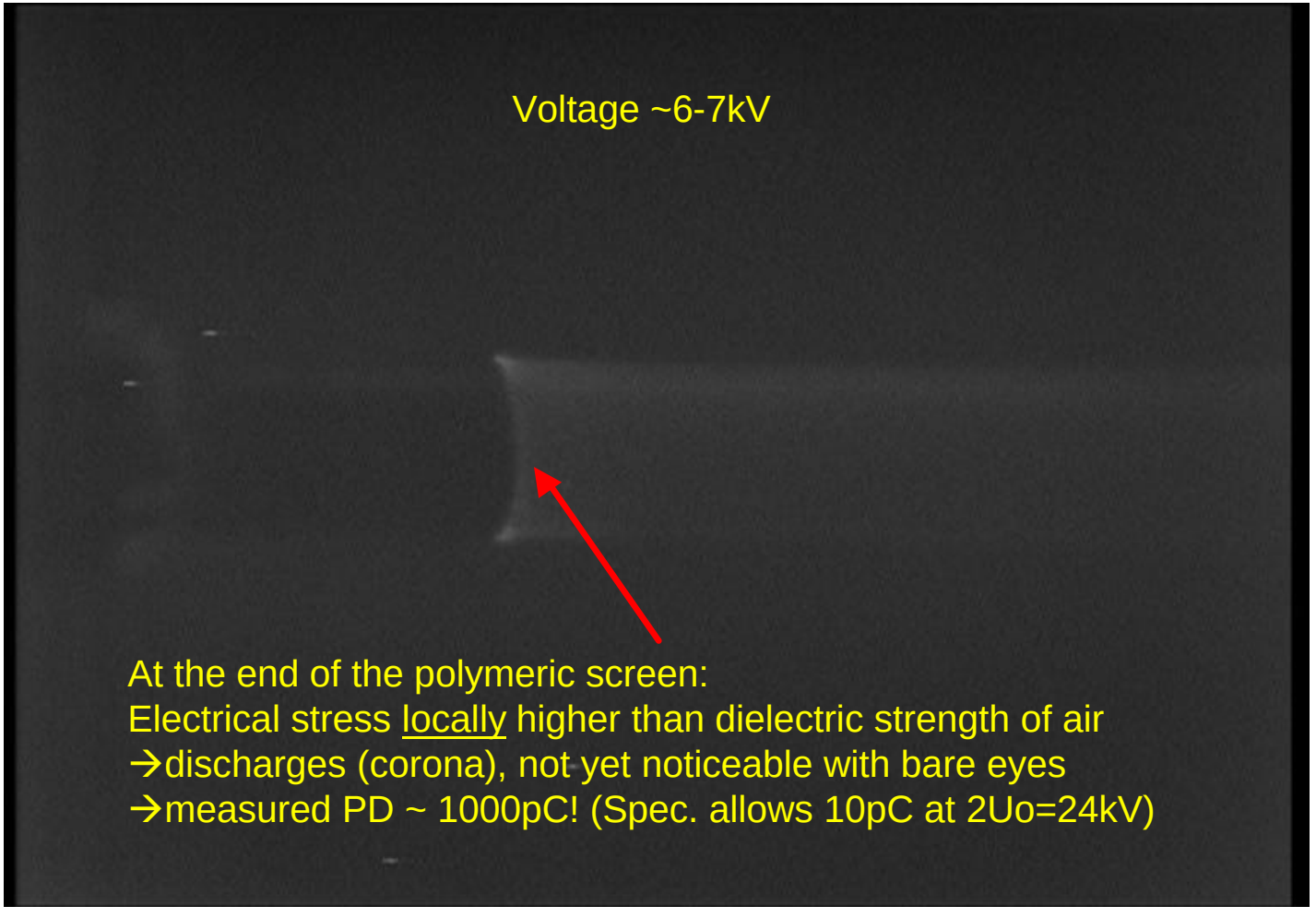
Polymeric Screen

Bare Insulation

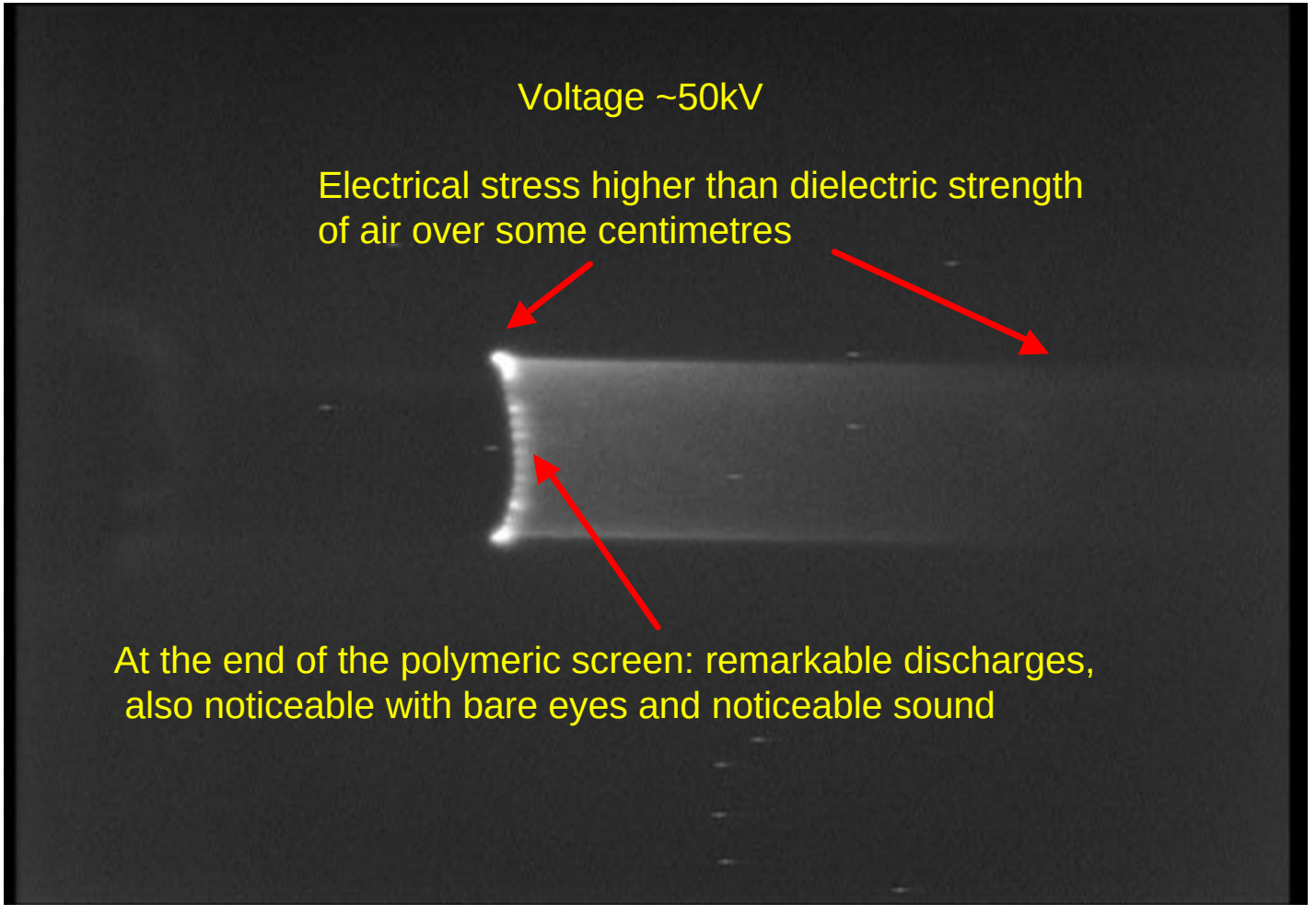


Cutback dimension longer as usual (500mm) to avoid flashover

Bare Cable


Voltage ~6-7kV
At the end of the polymeric screen:
Electrical stress locally higher than dielectric strength of air
→discharges (corona), not yet noticeable with bare eyes
→measured PD ~ 1000pC! (Spec. allows 10pC at 2Uo=24kV)

Bare Cable

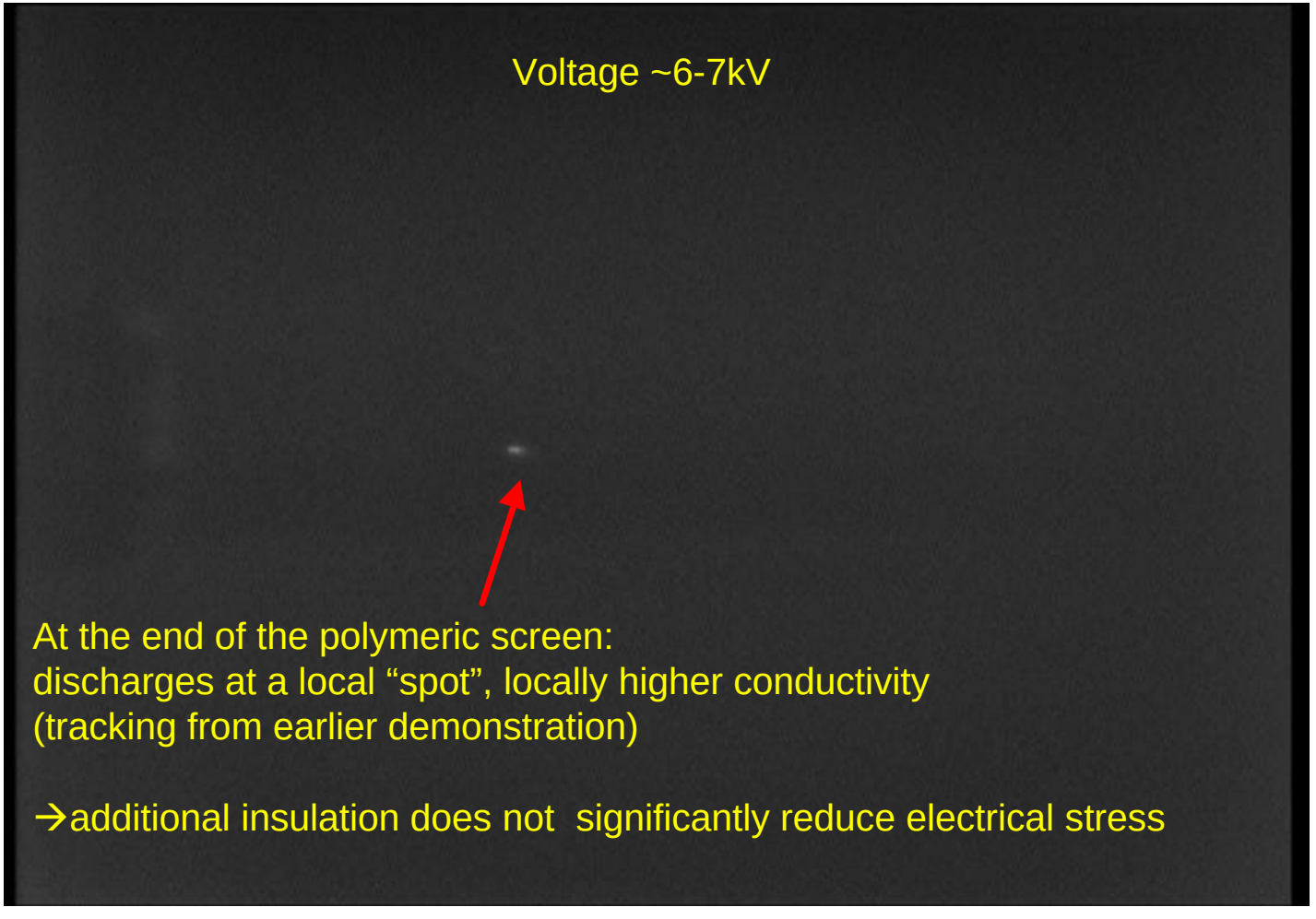

Voltage ~50kV
Electrical stress higher than dielectric strength of air over some centimetres
At the end of the polymeric screen: remarkable discharges, also noticeable with bare eyes and noticeable sound

Insulating Tubing

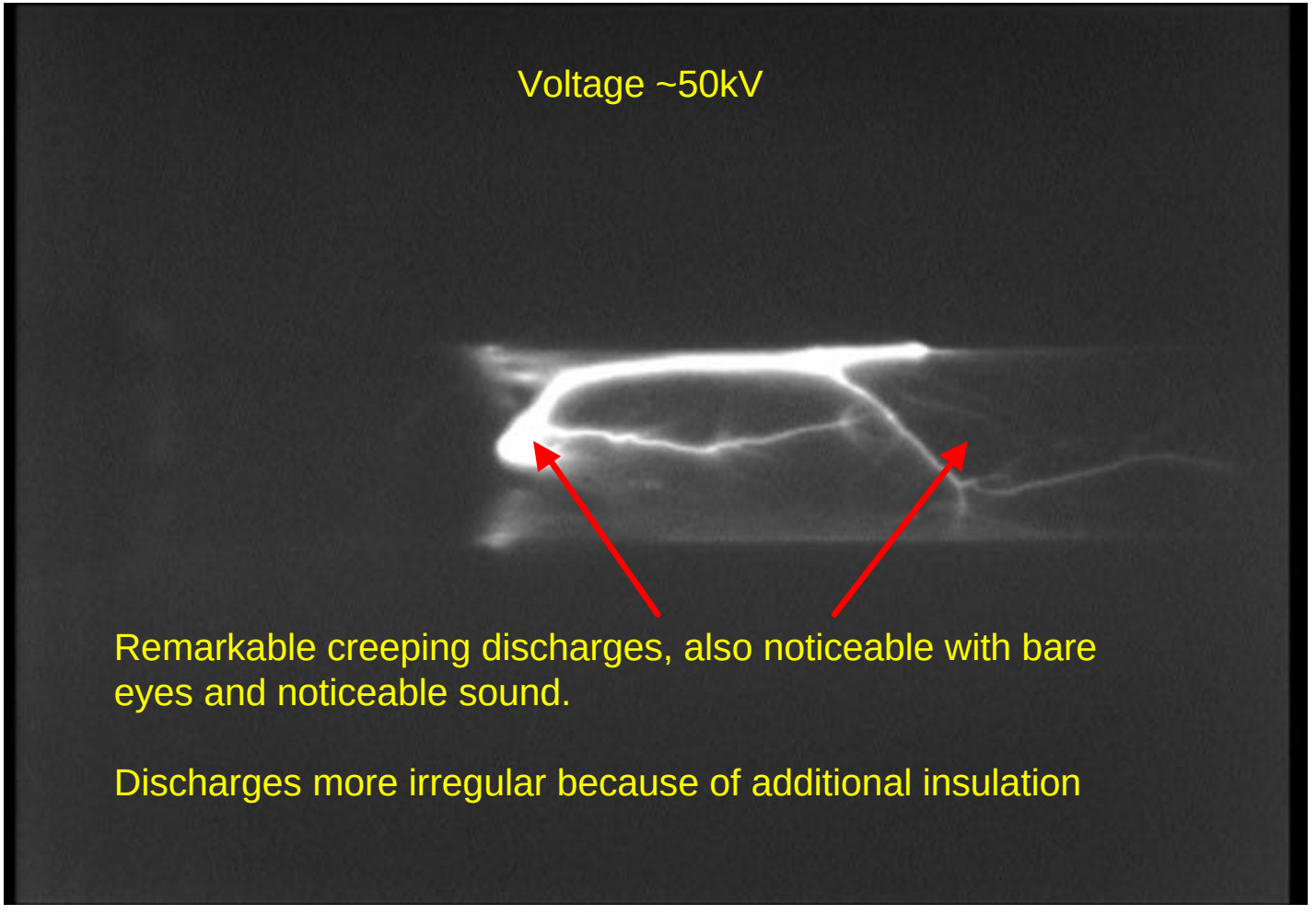
Insulating Tubing
(MWTM)

Question: Is additional insulation avoiding discharges?

Insulating Tubing

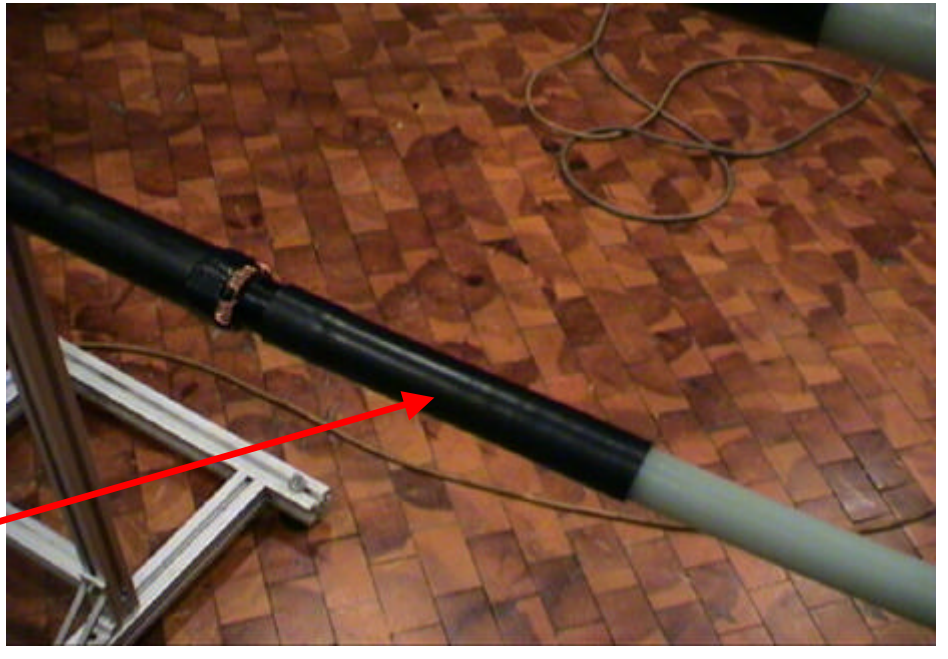


Insulating Tubing

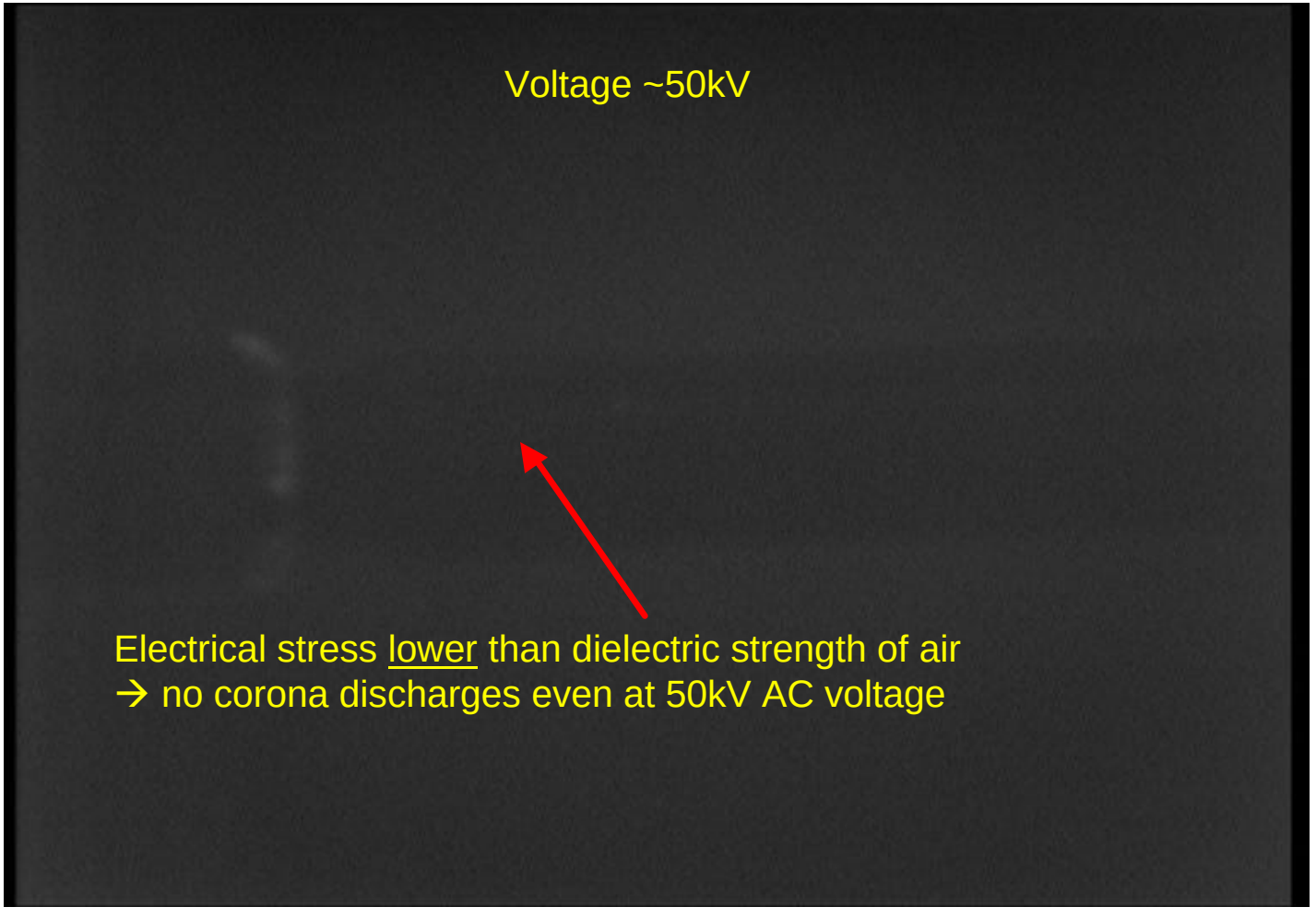


Stress Control Tubing

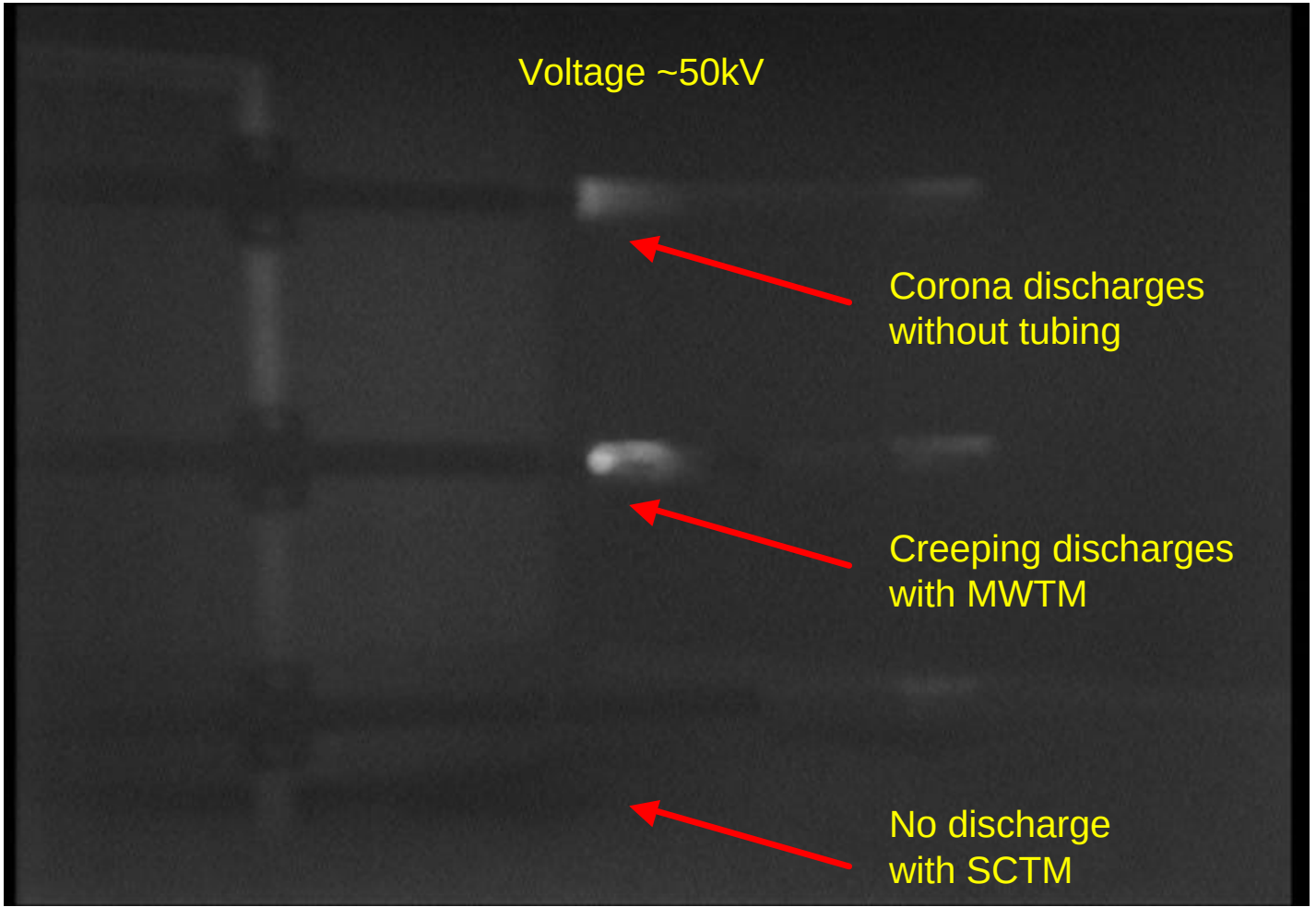
Stress Control Tubing
(SCTM)



Stress Control Tubing

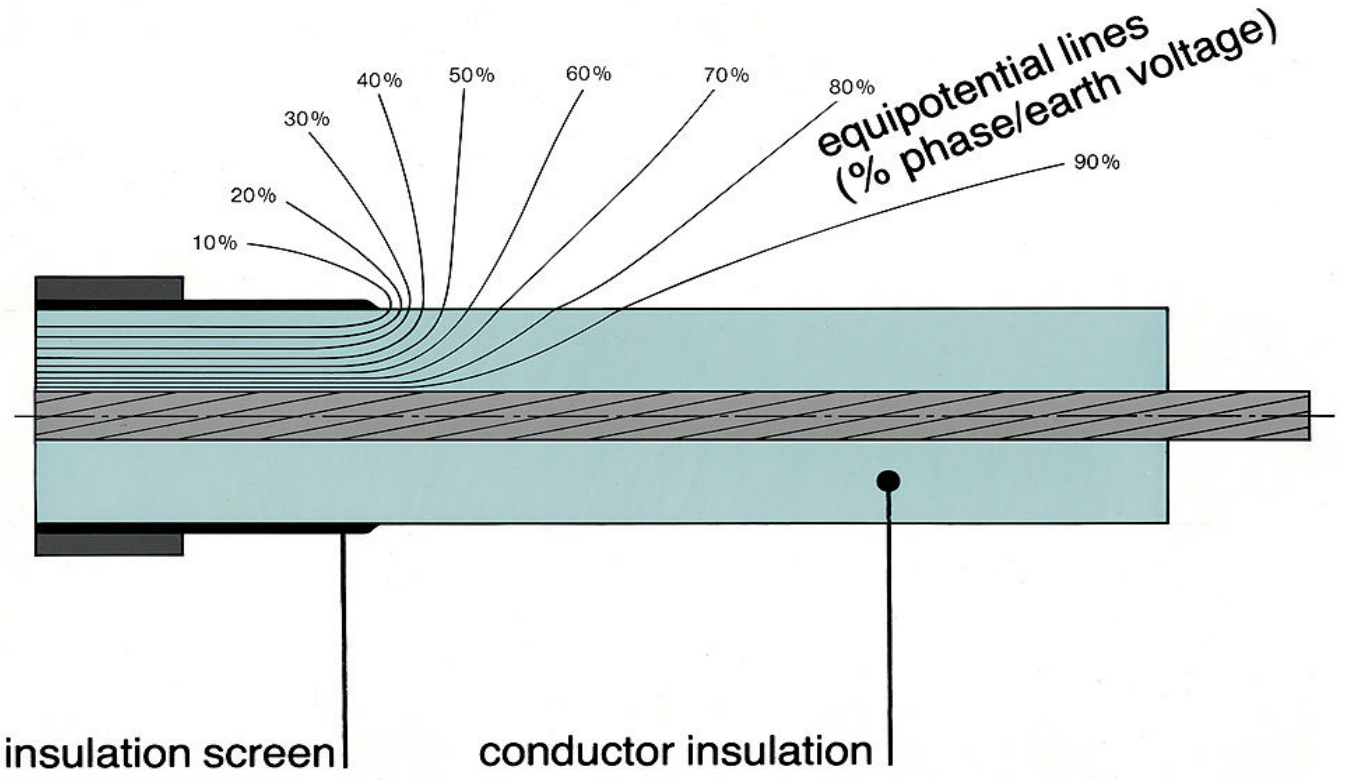


Comparison


Voltage ~50kV
Corona discharges without tubing
Creeping discharges with MWTM
No discharge with SCTM

Stress Control: Why?

Bare cable with screen cut back has very uneven voltage distribution resulting in high electrical field strength especially at the end of the screen



Stress Control: How

Stress control tubing with matched material properties (conductivity and permittivity) provides a more even voltage distribution and lower electrical field strength