OZM RESEARCH
Instruments & Technologies for Energetic Materials

Measurement of impact velocity of cladding metal by Photonic Doppler Velocimetry (PDV)

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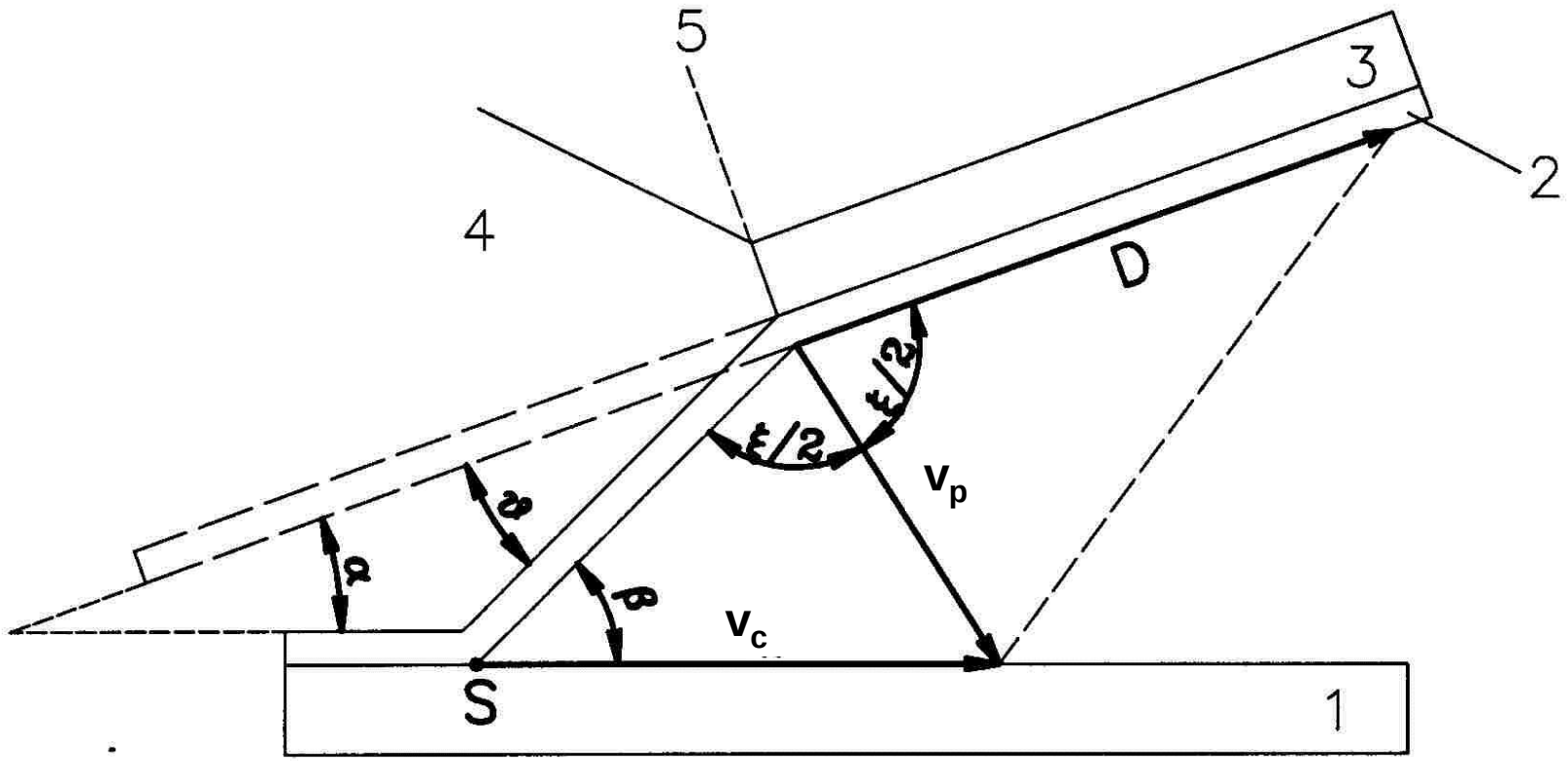
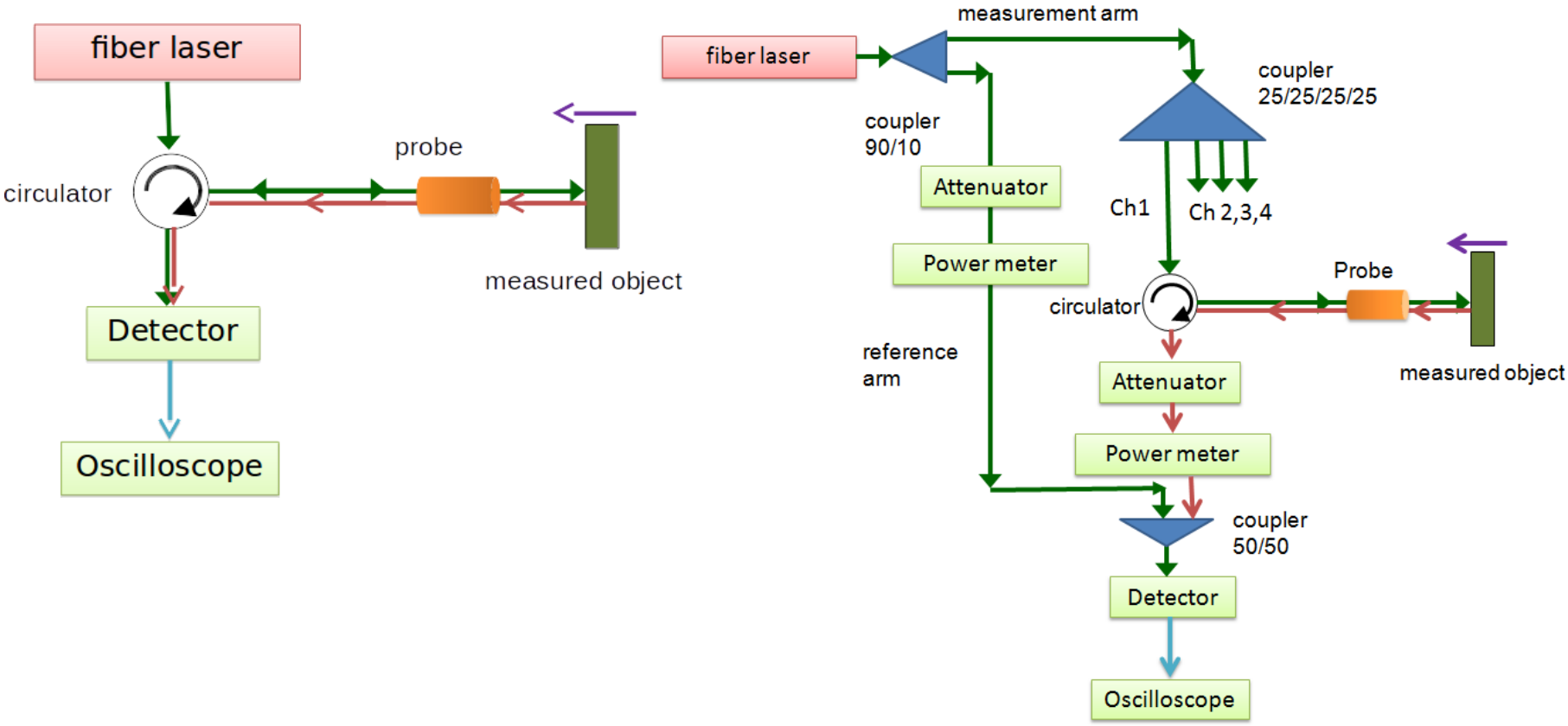
Problems:

- Measurement of impact velocity during the welding process by PDV
- Development of methodology for determination of impact velocity
- Construction of the equipment for commercial using
- Offer of the compact instruments

Measurement of the impact velocity $\mathbf{v_p}$



Measurement of impact velocity of cladding metal by Photonic Doppler Velocimetry



PDV is a laser interferometric technique for measuring velocities of moving surfaces up to tens of kilometers per second.

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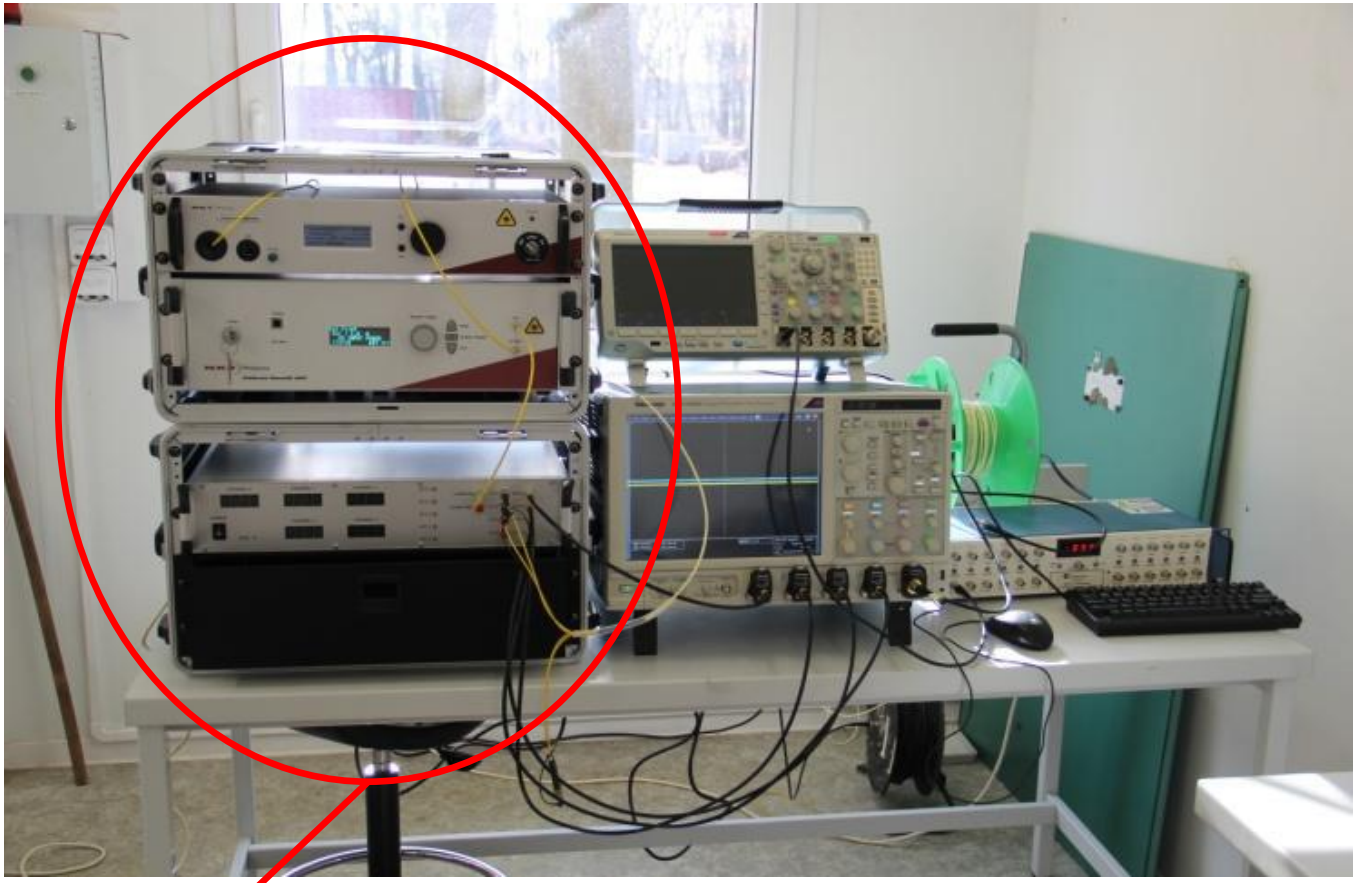
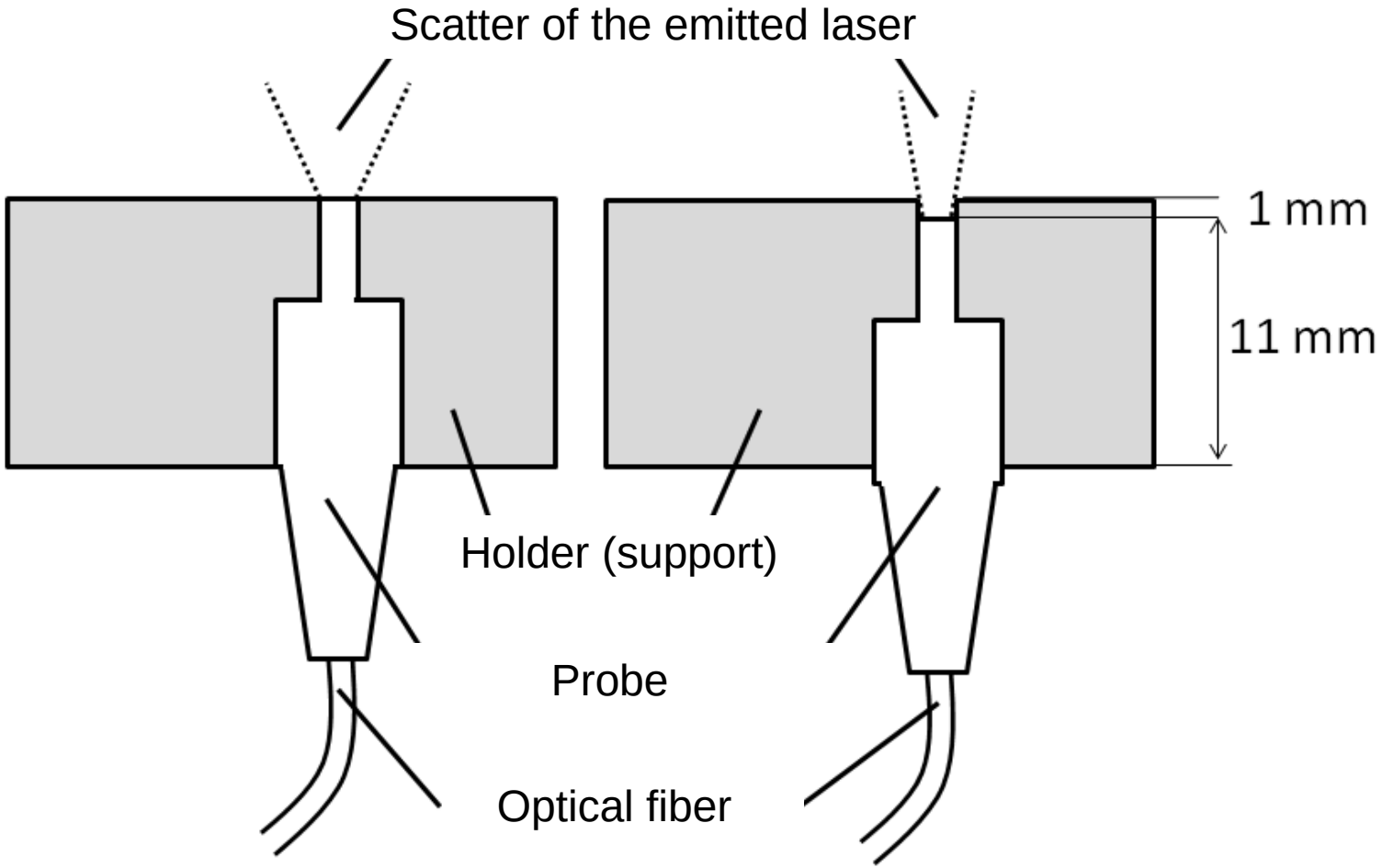


Laser, amplifier, 4-channel PDV


Scatter of the emitted laser
1 mm
11 mm
Holder (support)
Probe
Optical fiber

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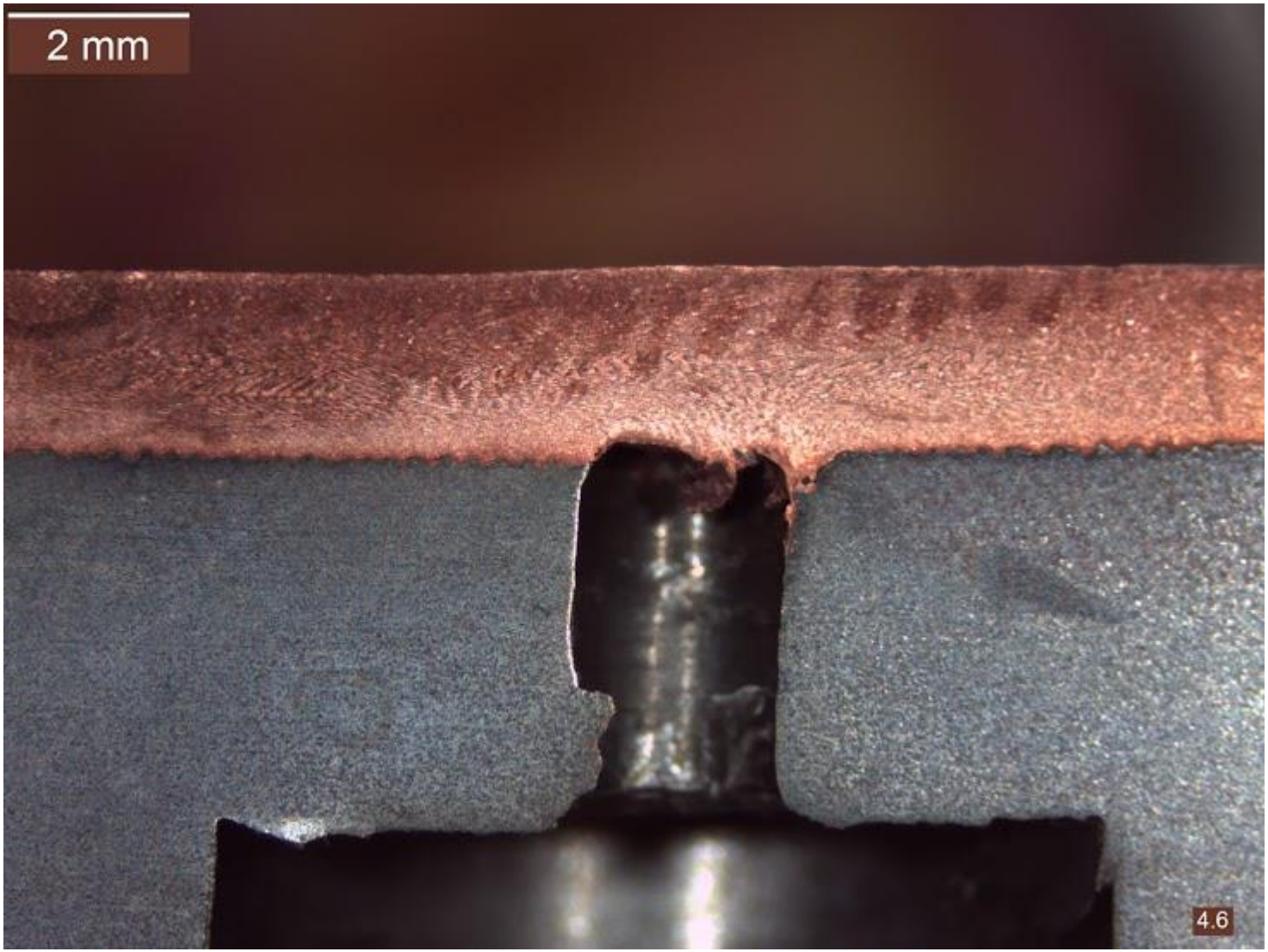
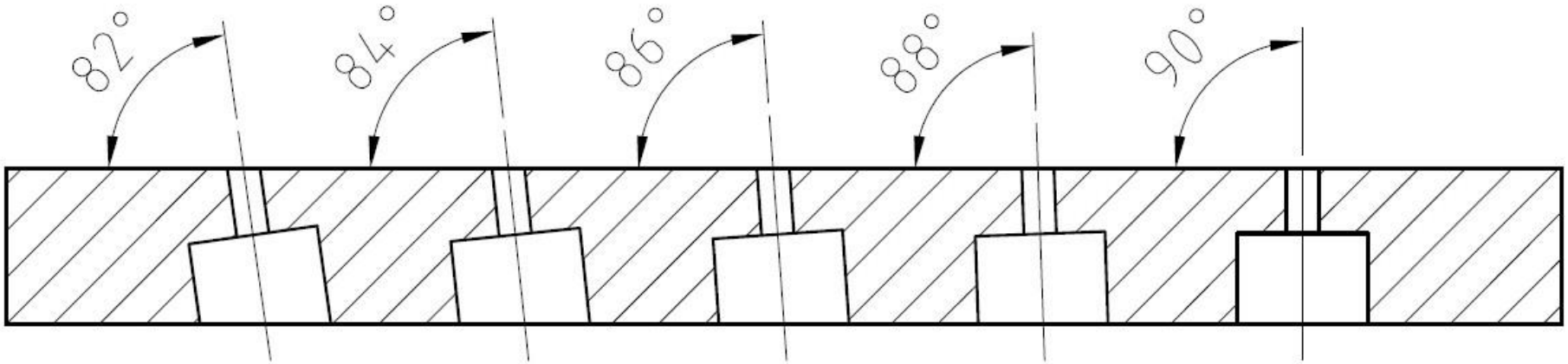


Test the effect of changes in the angle probe installation



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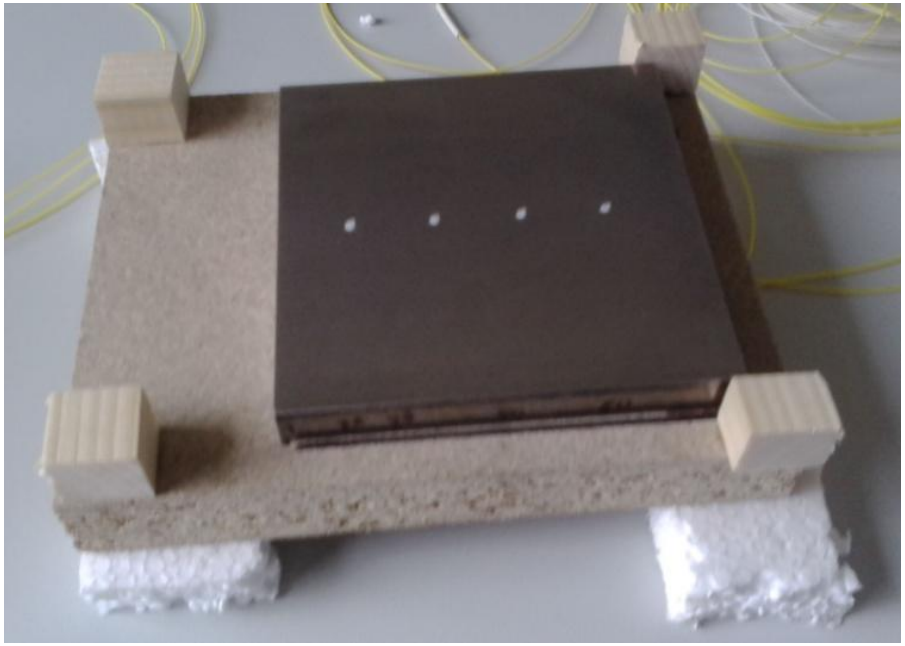
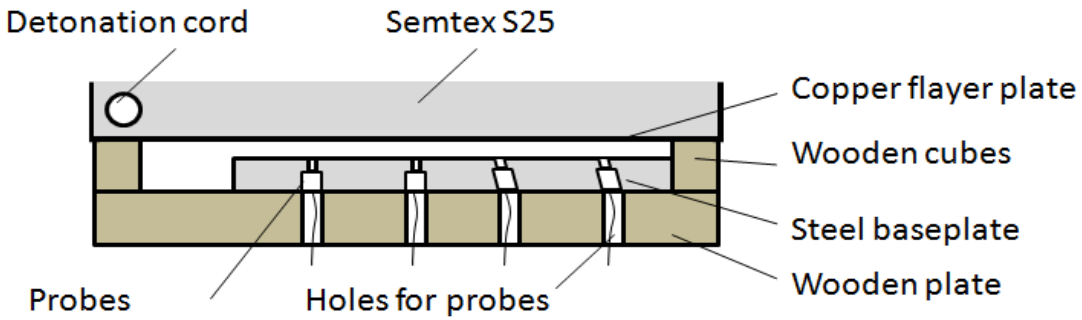
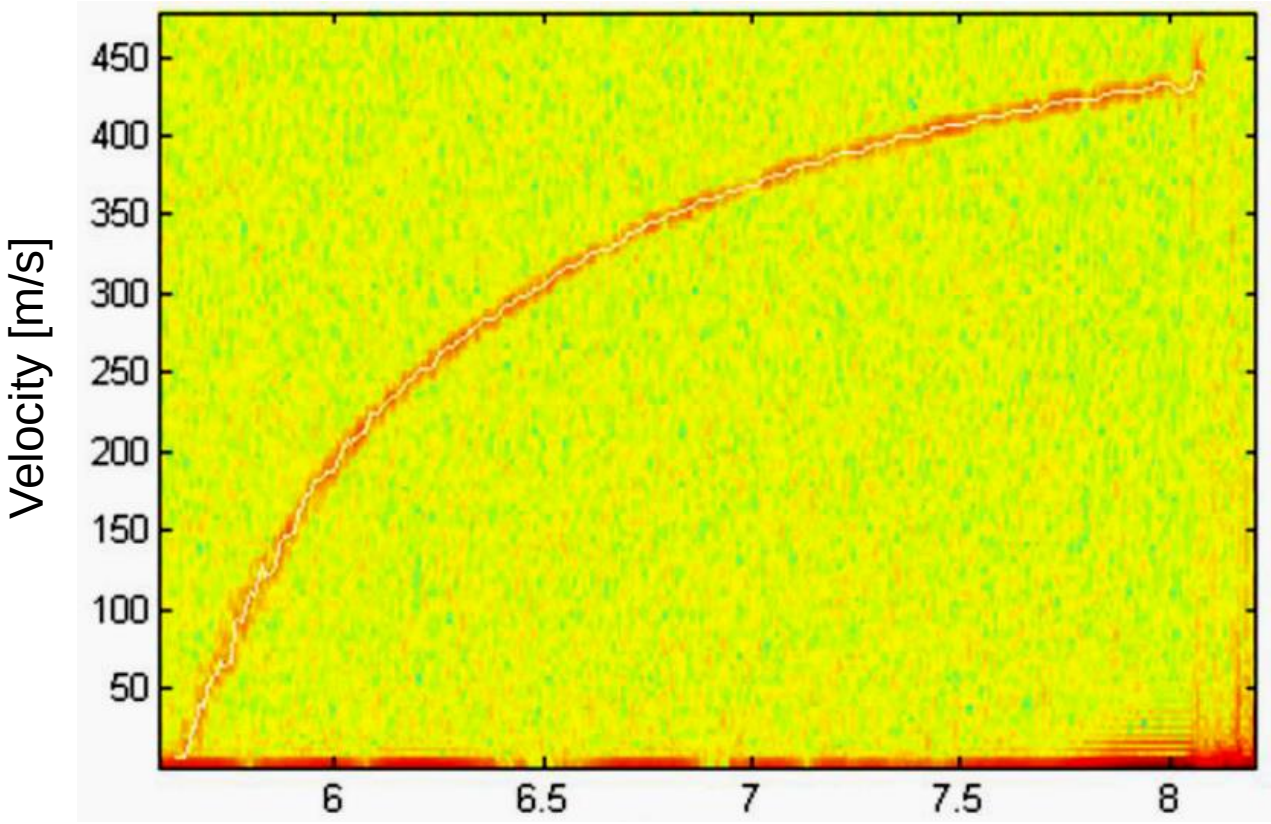
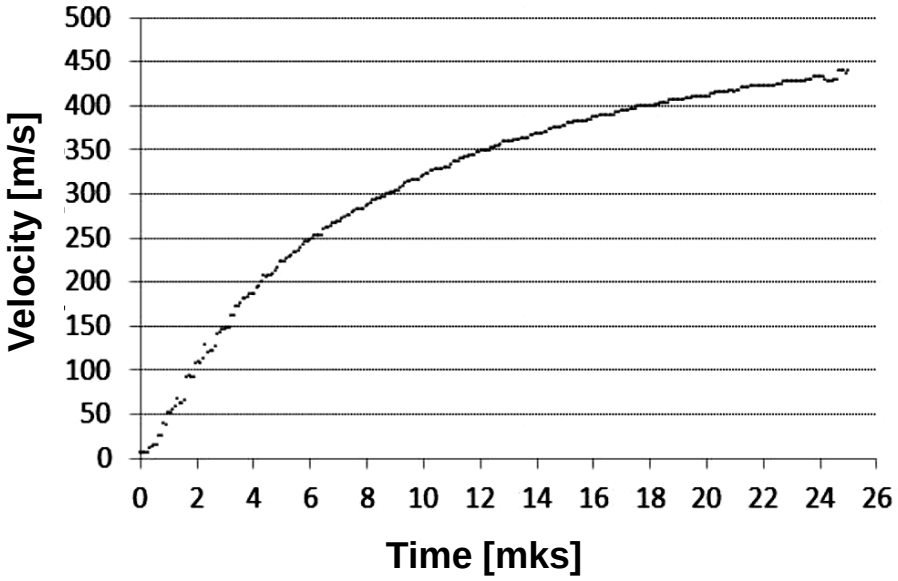


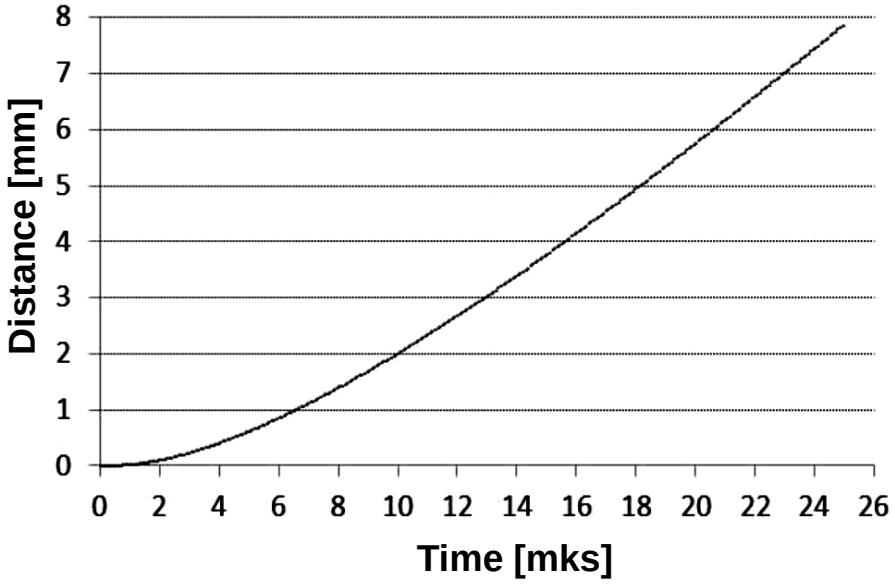


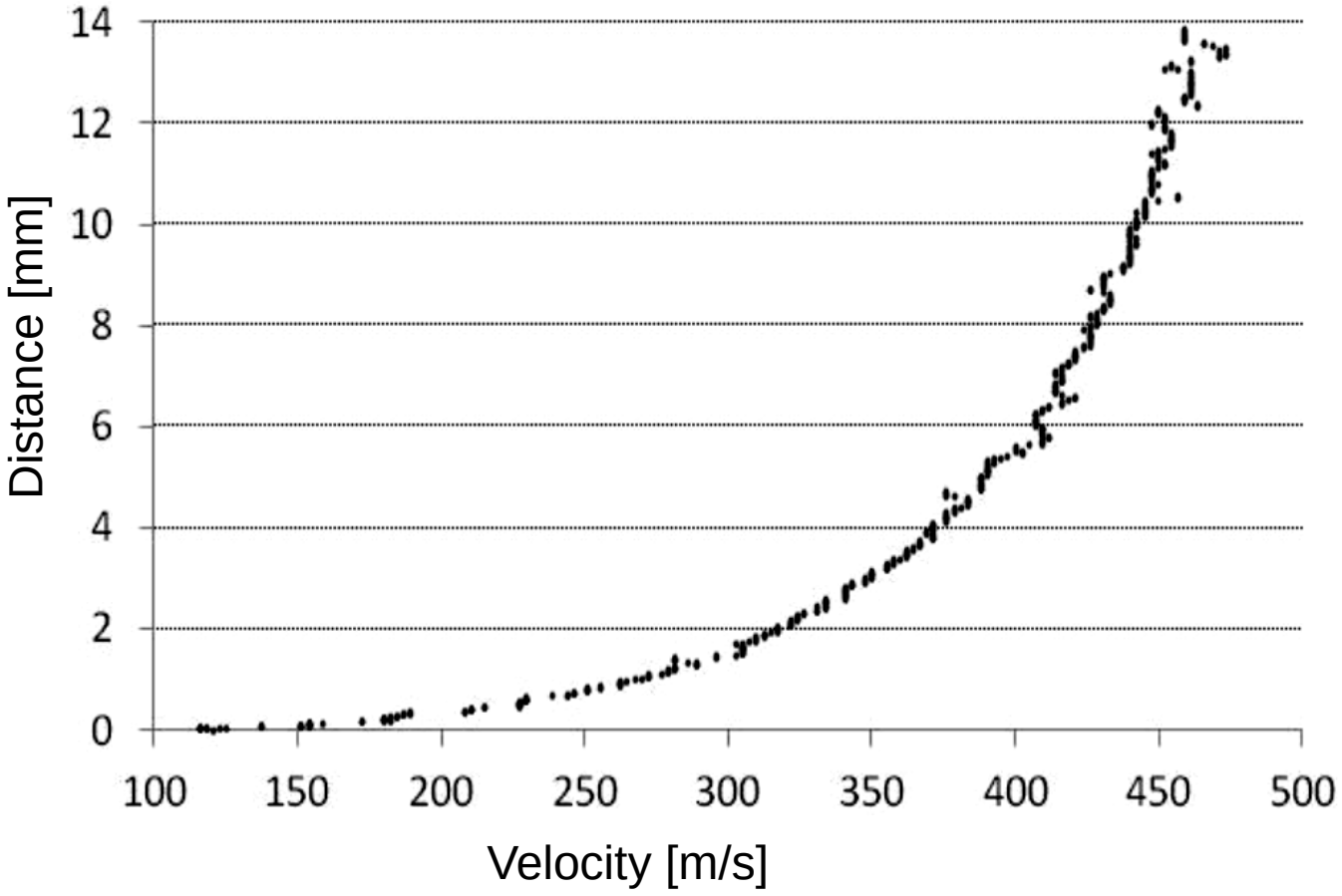


Spectrogram velocity measurement by PDV

Transformation of spectogram to graphs velocity - time and distance - time

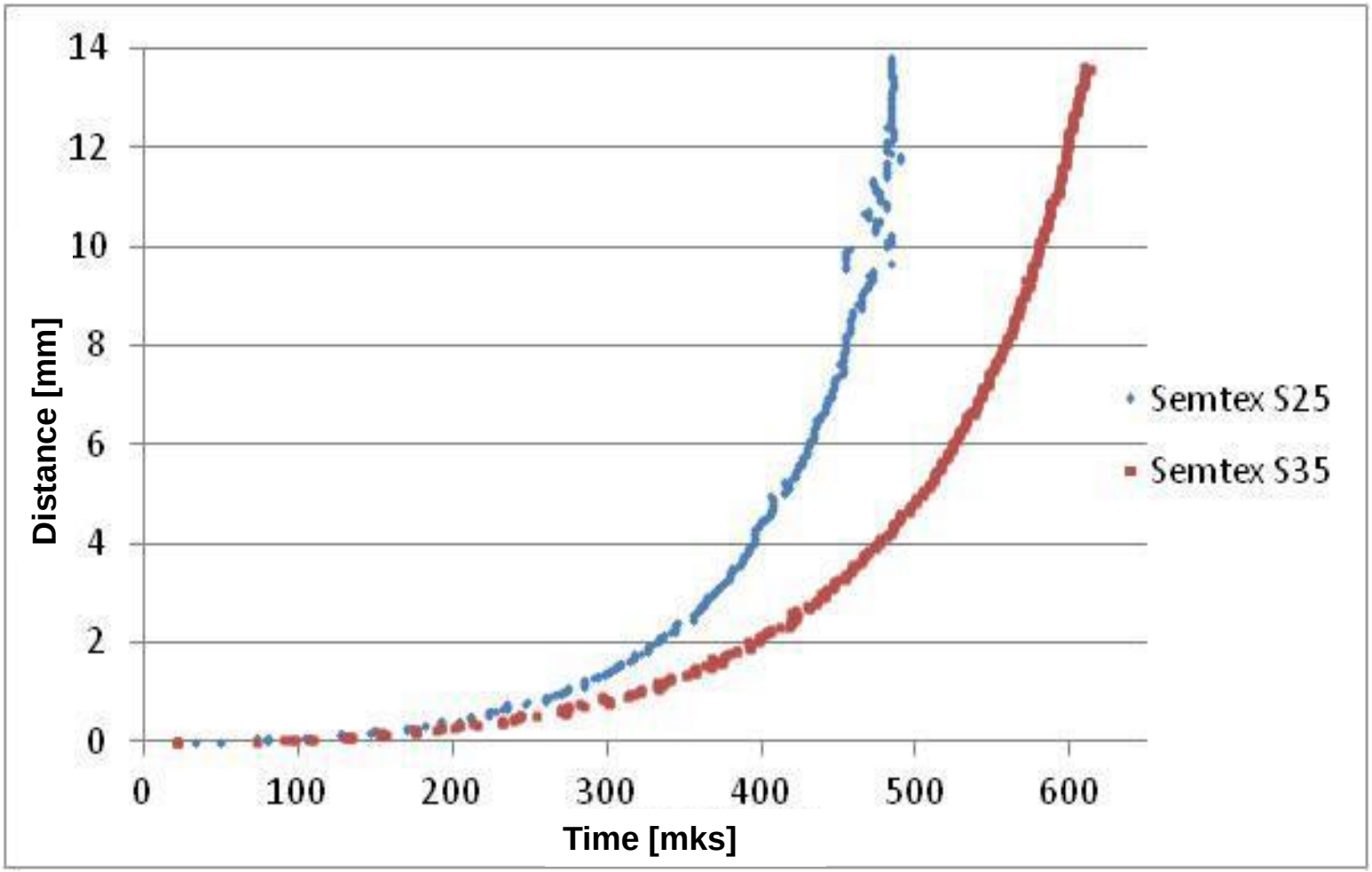




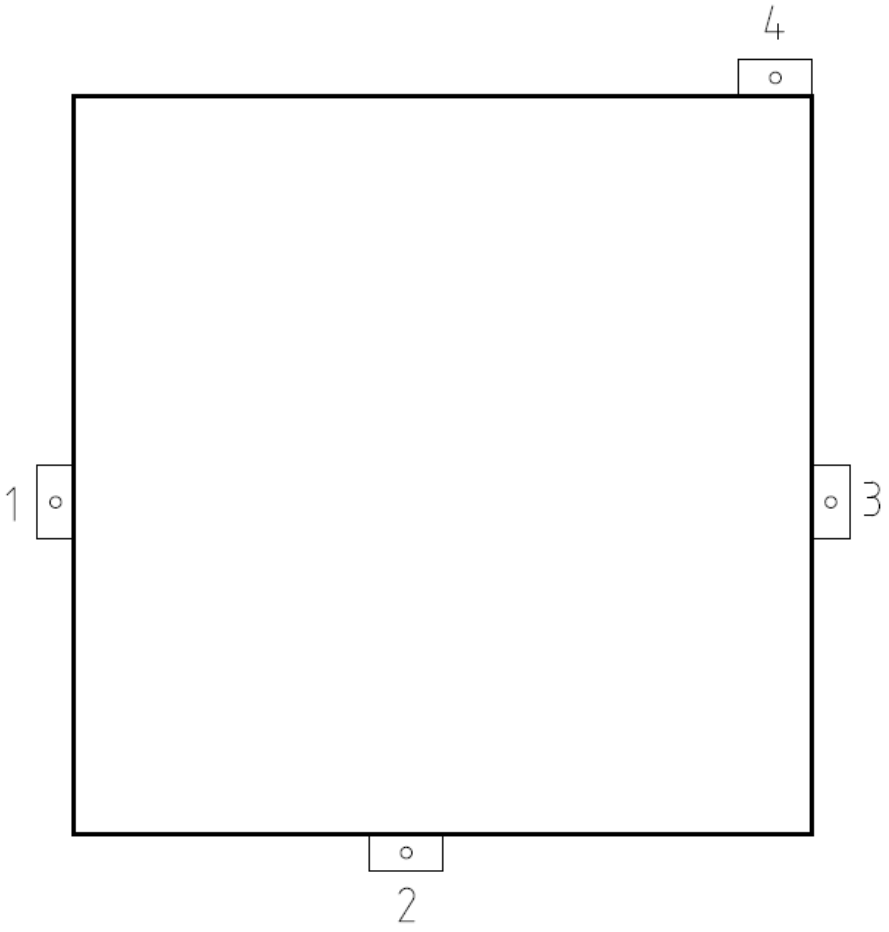


Transformation of the data to graph distance - velocity

Comparison of the impact velocity for two type explosive by acceleration of Cu plate 2.0 mm thickness.



An example of positioning sensors around the periphery of the base metal plate



Conclusion:

- PDV instruments is suitable method for measurement of impact velocity during the welding process.
- They were found appropriate procedures for practical application of measurement by PDV.
- For customers it is possible to offer the compact instruments.

THANK YOU FOR YOUR ATTENTION

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