**Innovated Direct laser welding of Al-Si coated press-hardened based on unique PANGUJIE® filler wire**

*Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences*

**Shanglu Yang, Wu Tao, Yanjun Wang, JinYu Bai, Wei Xu, Xuzhi Zhang and Yanjie Sun**

**Email:yangshanglu@siom.ac.cn**

Al-Si coated press hardened steels are widely used in the automotive industry which are the most important lightweight materials to facilitate reducing vehicle weight and provide safety to the passengers. The presence of Al-Si coating in the press hardened steels imposes huge challenges on laser welding of them because of the formation of brittle ferrite induced by diluting aluminum element of Al-Si coating into the molten pool during laser welding.

In the past decade, the state-of-the-art applies laser ablation to remove Al-Si coating around the welding zone prior to laser welding. Although it is effective, it adds huge manufacturing cost and needs accessional equipment to handle the particles from laser ablation. Furthermore, it is still difficult to laser weld of PHS higher than 1500MPa. We have invented innovate laser-filler wire process and invented unique filler wire based computational materials approaches. It is the world-first approach that can achieved high laser weld quality for different gauge and strength Al-Si coated PHS steels from various steel suppliers around the world. The new method has saved huge manufacturing cost and provides high manufacturing flexibility, which has been used to produce critical vehicle safety parts such as A/B pillar and door ring for more 2 million vehicles.

**Short Bio:**

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**Prof. Shanglu Yang** received his PhD degree in Department of Mechanical Engineering from Southern Methodist University, USA. He is a professor and director of Researcher Center for Laser Intelligent Manufacturing at Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences. He has received several awards including General Motors’ Individual Excellence, 2016 R&D 100 Award. 2023 Berthold Leibinger Innovationspreis Finalists, 2018 Laser Focus World Innovators Awards: Platinum-Level Award, AWS 2023 - A. F. Davis Silver Medal Award I – II, 2024 R&D 100 Award etc. He has received 115 patents and published 60 peer-reviewed journal papers.