

PRESS RELEASE

Quantum technologies burst onto the advanced manufacturing scene via AI

- *The Tekniker technology centre develops Quantum Machine Learning solutions to improve smart system performance*
- *It is within the framework of the BRTA Quantum project that it has been possible to apply a quantum model to estimate the final condition of a metal in an additive manufacturing process*

[Eibar, 4 March 2025] – Continuous progress made in the area of artificial intelligence (AI) has allowed these technologies to be incorporated to industrial processes in sectors associated with energy, the agri-food business or advanced manufacturing. As regards the latter, the introduction of AI has made it possible to optimise initial production parameters and predict critical failures in production processes to anticipate errors.

So far, these AI models have used classical automatic machine learning techniques on conventional computers. However, the onset of quantum computing has given rise to the so-called Quantum Machine Learning concept, a new approach whose aim is to significantly improve the performance of traditional AI.

Tekniker, the Basque Technology Centre and member of the Basque Research and Technology Alliance (BRTA), with more than 20 years of experience developing smart information systems as a support for industrial processes, has spent the last two years developing these new quantum technologies to speed up the training of AI models and, consequently, improve their efficiency and accuracy.

Eider Garate and Meritxell Gómez, two Tekniker researchers, stress that “by developing quantum AI it will eventually be possible to solve problems that, could not be addressed and overcome with conventional computers due to their complexity.

Application in the industry

It is within the framework of the collaborative BRTA Quantum framework programme jointly funded by the Basque Government and the Gipuzkoa Provincial Council that Tekniker has applied an automatic machine learning system to monitor the final condition of metals undergoing solidification processes in the area of laser additive manufacturing.

The researchers explain that “although quantum computers are still under development, our work proves that quantum variational algorithms developed at Tekniker can not only compete with classical machine learning models, but also offer a promising future once these technologies become fully mature”.

This work was presented at two highly relevant conferences. Firstly, at Quantum Matter, held last year in San Sebastian and, secondly, at the Borderless Artificial Intelligence and Quantum Computing convention in France, where the lecture received first prize to the best paper. This recognition does not only validate all the progress made to date, but also reinforces our commitment to perform future research work along these lines.

The entire project has been carried out in cooperation with Basque organisations and has situated Tekniker amongst other leading technological stakeholders in the area of quantum computing.

The technology centre’s future goals are focused on doing more work associated with quantum technologies used to improve the performance of algorithms applied to machine learning, simulation and optimisation to explore their capabilities and evaluate the possibility of reducing the high computational load of certain tasks associated with complex physical resolution processes.

The quantum year

UNESCO proclaimed 2025 as the International Year of Quantum Science and Technology to raise society’s awareness in terms of the potential applications connected to a discipline that is revolutionising all areas including industrial manufacturing.

It is within the scope of this initiative that Tekniker is collaborating in an exhibition called “Visiones Cuánticas” that opened at Tabakalera on February 20 and can be seen by the general public until June 8.

Towards the end of this year, moreover, the Basque Country will become a reference in the world of quantum computing thanks to one of the six quantum computers manufactured by the technological multinational IBM to be installed in San Sebastian. This milestone is the end result of the BasQ Alliance in which a large number of leading Basque institutions, companies R&D organisations such as Tekniker have been involved.

Concerning Tekniker

Tekniker is a technology centre specialised in Advanced Manufacturing, Surface & Product Engineering and ICTs for manufacturing. Its mission is geared towards fostering growth and wellbeing through R&D&I actions aimed at society and enhancing competitiveness in the business fabric in a sustainable manner. Tekniker is a member of the Basque Research and Technology Alliance (BRTA).

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