

# Differentiable Vertex Fitting for Jet Flavour Tagging

*Friday 19 July 2024 15:55 (17 minutes)*

We propose a differentiable vertex fitting algorithm that can be used for secondary vertex fitting, and that can be seamlessly integrated into neural networks for jet flavour tagging. Vertex fitting is formulated as an optimization problem where gradients of the optimized solution vertex are defined through implicit differentiation and can be passed to upstream or downstream neural network components for network training. More broadly, this is an application of differentiable programming to integrate physics knowledge into neural network models in high energy physics. We demonstrate how differentiable secondary vertex fitting can be integrated into larger transformer-based models for flavour tagging and improve heavy flavour jet classification.

## Alternate track

### I read the instructions above

Yes

**Authors:** OCHOA, Ines (LIP - Laboratorio de Instrumentação e Física Experimental de Partículas (PT)); SHOE-MAKER, Jonathan (SLAC National Accelerator Laboratory (US)); KAGAN, Michael (SLAC National Accelerator Laboratory (US)); SMITH, Rachel Emma Clarke (SLAC National Accelerator Laboratory (US)); DE ALMEIDA INACIO, Ruben Miguel (LIP - Laboratorio de Instrumentação e Física Experimental de Partículas (PT))

**Presenter:** OCHOA, Ines (LIP - Laboratorio de Instrumentação e Física Experimental de Partículas (PT))

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