Foundational motivations and diagrammatic tools for quasiprobabilistic representations

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Quasiprobability representations have always been useful in quantum mechanics, both as a representation of quantum processes and as a means of making connections to classicality. In recent years, new mathematical tools have been developed for studying quasiprobability representations, and insights from quantum foundations have deepened our understanding of how these representations relate to classical explainability. I will review a number of these tools and insights, focusing on connections with generalized probabilistic theories (GPTs) and with generalized noncontextuality. I will also discuss how diagrammatic circuits can be used as a powerful and intuitive language for studying quasiprobability representations.