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Dynamic vacuum simulation using isotherms

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Over recent years, a variety of isotherm models have been employed at CERN to simulate a broad spectrum of scenarios. These models, originally developed from zero dimensional models prepared by Redhead [1] and Kanazawa [2] have evolved into more sophisticated 1D and 3D simulations. They have been used for diverse applications, ranging from optimizing bakeout for gravitational wave detectors to modelling XHV evolution in cryogenic traps, pumpdown dynamics, and water propagation in accelerators, among others. In this contribution, we provide a comprehensive overview of the various models employed and the wide diversity of problems they have been successfully addressed.

References:
[1] P.A. Redhead, Modeling the pump-down of a reversibly adsorbed phase. I. Monolayer and submonolayer initial coverage, J. Vac. Sci. Technol. Vac. Surf. Films 13 (1995) 467. https://doi.org/10.1116/1.579381.
[2] K. Kanazawa, Analysis of pumping down process, J. Vac. Sci. Technol. A 7 (1989) 3361–3370. https://doi.org/10.1116/1.576151.

Summary

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