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SIMULATED INSTRUMENTAL CONSTRAINTS
ON SUB-STELLAR ATMOSPHERIC
RETRIEVALS FOR THE JAMES WEBB SPACE
TELESCOPE'S MID-INFRARED IMAGER.

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*Simulated Instrumental Constraints on Sub-Stellar Atmospheric Retrievals for the
James Webb Space Telescope's Mid-Infrared Imager.*

TITLEBACK

This document was written with L^AT_EX on Ubuntu using ArsClassica, a re-working of the ClassicThesis style designed by André Miede, inspired to the masterpiece *The Elements of Typographic Style* by Robert Bringhurst.

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*We have seen that computer programming is an art,
because it applies accumulated knowledge to the world,
because it requires skill and ingenuity,
and especially because it produces objects of beauty.*

— Donald Ervin Knuth

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INTRODUCTION

1.1 BROWN DWARFS

1.1.1 Physics

1.1.2 Observational Properties

1.2 MIRI

1.2.1 JWST

1.2.2 MRS

1.2.3 Coordinates

1.2.4 Spectroscopy

1.3 ATMOSPHERIC MODELLING

1.3.1 petitRadTrans

2 | MODELLING THE MIRI MRS

2.1 MIRISIM

2.1.1 Architecture

2.1.2 Data Products

2.1.3 Instrumental effects

2.1.4 Fringing

Random fringing text example **ref:Argyriou2018**.

FM Data

CV Data

Modelling

2.1.5 Implementation

2.2 FRINGING MODEL COMPARISON

3 | SPECTRUM EXTRACTION

3.0.1 JWST Pipeline

Stage 1 Processing

Stage 2 Processing

Fringing correction

Aperture Photometry

3.1 FRINGING RESULTS

3.1.1 Cross-Correlation

3.1.2 Effects of fringing on spectral extraction

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ATMOSPHERIC RETRIVALS

4.1 INTRODUCTION

4.2 BAYESIAN METHODS

4.2.1 MCMC

4.2.2 Nested Sampling

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4.3 TARGETS

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4.4 RESULTS

5 | CONCLUSIONS