

## 报告人简介 Speaker

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北京大学哲学系逻辑学专业博士研究生  
研究方向包括数理逻辑（尤其是集合论）、数学哲学等

PhD candidate at the department of philosophy,  
Peking University

His research interest includes mathematical logic,  
especially set theory, and the philosophy of  
mathematics



## 报告安排 How to come

### ▶ 时间

▷ 3月20日 星期二 下午 3:00

### ▶ 地点

▷ 复旦大学邯郸校区光华西主楼 2401

### ▶ When

▷ 3:00 p.m., Mar. 20th, 2012

### ▶ Where

▷ Room 2401, West Guanghua Tower  
220 Handan Road, Shanghai

## 内容提要

### ▶ 当代数学哲学与数学基础研究的起点

- ▷ 数学的公理化
- ▷ 不完全性现象
- ▷ 数学公理系统的一致性强度排列

### ▶ 数学哲学无关的数学；数学无关的数学哲学

- ▷ 严格有穷数学
- ▷ 集合论多宇宙观

### ▶ 哲学对数学的主动影响

- ▷ 数学修正主义及其事实上的失败

### ▶ 哲学对数学的实际影响，以决定性公理为例的说明

- ▷ 哲学如何影响数学家对数学问题的关切
- ▷ 哲学如何影响具体的研究策略

## Outline

### ▶ The preliminary to contemporary philosophy of mathematics or foundation of mathematics

- ▷ Axiomatization of mathematics
- ▷ The phenomenon of incompleteness
- ▷ The consistency strength hierarchy (Gödel hierarchy)

### ▶ Philosophy neutral mathematics and mathematics neutral philosophy

- ▷ Mathematics of strict finitism
- ▷ Set theory multiverse view

### ▶ Philosophy's deliberate impacts on mathematics

- ▷ The revisionism on mathematics and its practical failure

### ▶ Philosophy's real impacts on mathematical practice: A case study on the axioms of determinacy

- ▷ How philosophy impacts on mathematician's motivation
- ▷ How philosophy impacts on the strategies of searching a proof

## 公理系统的一致性强度排列 Gödel Hierarchy

Reinhardt ( $0 \neq 1$ )

$I_0$

$n$ -huge

Supercompact

Superstrong

Woodin

Strong

# Measurable Inaccessible ZFC Type theory

## $Z_2$

$\Pi_1^1$ -CA<sub>0</sub>

ATR<sub>0</sub>

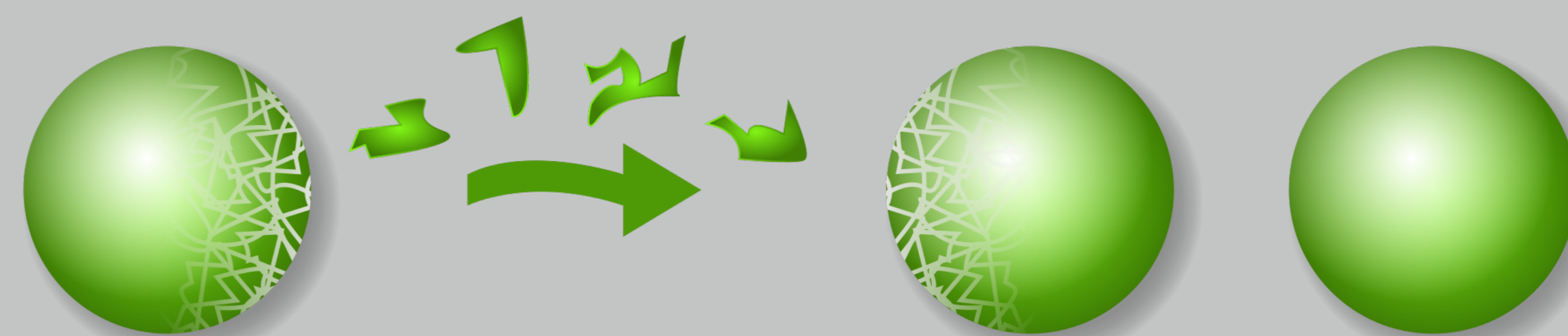
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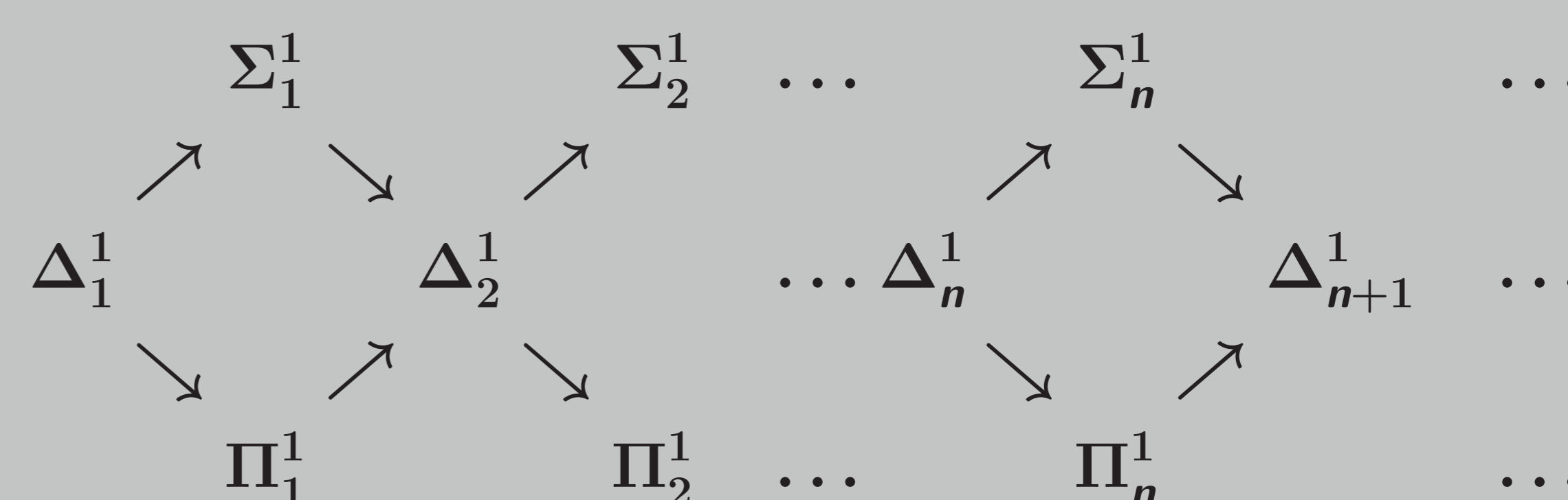
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Q

## Banach-Tarski 悖论 Banach-Tarski Paradox



## 投射集谱系 Projective Hierarchy



## 自然数无穷博弈 Infinite games on natural numbers

player I:  $a_0 \quad a_2 \quad \dots$

player II:  $a_1 \quad a_3 \quad \dots$

Player I wins the game  $G_A$  if  $\langle a_i : i \in \mathbb{N} \rangle \in A$