

团队简介 Team Profile

非线性岩体力学与工程团队

随着矿井开采温度和开采强度的持续增加，煤与瓦斯突出、瓦斯爆炸、顶板垮落、冲击地压、矿井突水等矿山灾害频发，造成重大人员和财产损失，给社会稳定造成负面影响。除了管理因素之外，缺乏对深部开采条件下地质构造、应力场特征、煤岩体的力学响应特征、灾害的孕育—演化—触发机制等基础研究是主要因素之一。

非线性岩体力学与工程研究团队由多名在岩石本构理论与破坏力学、岩体渗流理论、煤田地质与突水灾害防治、非线性计算力学等领域有一定造诣的专家和年轻学者组成，旨在运用现代非线性数学力学方法、对深部煤岩体的复杂力学行为和致灾机理开展系统基础研究，最终形成深部复杂破碎煤岩体的基础力学理论以及矿山灾害综合防治的理论与技术体系。

团队共有人员 16 人，其中教授 6 人、副教授 10 人。其中 1 人入选江苏省“333 人才工程”第二层次，1 人被评为“万人计划”领军人才，团队入选科技部创新人才推进计划“重点领域创新团队”，1 人入选教育部“新世纪

优秀人才支持计划”，近三年获国家奖 3 项、省部级奖 7 项，目前承担国家重点基础研究发展计划（973）项目 3 项、国家自然科学基金 5 项。

本团队的主要研究方向有非线性岩体本构模型研究、岩体损伤与破坏力学理论研究、裂隙岩体渗流理论研究、矿井突水机理与灾变模型研究等。团队的中心研究工作将抓住天然岩体中包含大量断层、节理、破碎带等不同尺度规模的不连续结构这一本质特征，突破传统连续介质理论的局限性，深入研究开采影响下破碎岩体结构描述、破碎岩体强度、变形和稳定性特征和演化规律，在岩体力学研究方法和核心科学问题上取得突破，并以此为基础，对煤与瓦斯突出、冲击地压、矿井突水等矿山灾害给出科学解释，从而对矿山灾害进行科学有效的预测预报和控制。

Research Team of Nonlinear Rock Mechanics and Engineering

As mining temperature and mining intensity are continuously increasing, mine disasters such as the outburst of coal and gas, gas explosion, roof collapse, rock burst and water inrush occur more frequently than before, which are not only inflicting heavy casualties and property losses, but also damaging the stability of the society. Besides lacking of proper management, the shortage of some basic research on geological structure, stress field characteristics, mechanical response characteristics of coal and rocks, and the gestation-evolution-triggering mechanism of disasters under deep mining conditions is also one of the main reasons that caused this situation.

The research team of nonlinear rock mechanics and engineering consists of distinguished experts and young scholars who are accomplished in fields such as the constitutive theory and failure mechanics of rocks, the rock seepage theory, the coal geology exploration and the prevention and control of water-inrush, the nonlinear computational mechanics, and so on. This team aims at taking advantage of the modern nonlinear computational mechanics to systematically conduct a series of fundamental research on the complex mechanical behaviors of deep coal and rock masses and the disaster-causing mechanics, so that the basic mechanical theory of fractured complex structure of deep coal and rocks as well as the theory and technology of comprehensive control of mine disasters could be thus established.

This team is made up of 15 staff including 6 professors and 10 researchers with PhD degree. Among them, one of them has been selected for the second level of the “333 Talents Training Project” of Jiangsu Province, and one has been honored the title of Leading Scientist of the “Ten Thousand Talents Training Project”. The whole team has been recognized as the “Innovation Team in Key Area” by the talents training program of the Ministry of Science and Technology. Moreover, one of the team members has also been selected for the Ministry of Education’s supporting scheme of the “Program for New Century Excellent Talents”. In the last three years, the team has won 3 national awards and 7 provincial and ministry level awards. In addition, this team has chaired over 3 National Program on Key Basic Research Project (973 Program), and 5 projects supported by the National Natural Science Foundation of China.

The research interests of this team mainly cover the constitutive models of non-linear rocks, the theory of rock damage and failure mechanics, the seepage theory in fractured rocks, and the mechanism of water-inrush in mine and its disaster model. The team is going to make use of the essential feature of the natural rocks: containing a large number of discontinuities in different scales, such as faults, joints and fractured zones to break through the limitations of traditional continuum theory, and to describe the fractured rocks’ structure, the strength, deformation, stability characteristics and the evolution of the fractured rocks when mining, and make progress in the exploration of the research method of rock mechanics as well as some core scientific issues. Based on that, the team will step further to scientifically explain the mining disasters such as the outburst of coal and gas, rock burst and water inrush, and hence to predict and control the mine disasters in a scientific and effective way.

非线性岩体力学与工程团队 Research Team of Nonlinear Rock Mechanics and Engineering



团队最新研究进展及应用方向： Latest Research Progress and Application Direction of the Team:

1. 破断岩体力学行为分型研究
The fractal mechanical behaviors of fractured rocks
2. 煤层瓦斯安全高效抽采关键技术体系及工程应用
Key technology system for safe and high-efficient extraction of coal and gas and its application
3. 深部岩体分形重构理论与应力可视化方法
Fractal reconstruction theory and stress visualization method for deep rocks
4. 多场耦合渗流理论及应用
Multi-physical coupling theory and its application