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PERSONALIA

Памяти Юрия Моисеевича Кагана

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4 июня 2019 года скончался выдающийся физик, академик Российской академии наук Юрий Моисеевич Каган.

Совсем недавно, 6 июля 2018 года, Юрию Моисеевичу исполнилось 90 лет. В связи с этой датой журнал *Успехи физических наук* опубликовал персоналию (*УФН* **188** 799 – 800), в которой коллеги и друзья тепло поздравили Юрия Моисеевича с Юбилеем, рассказали о главных этапах его жизненного пути и крупнейших достижениях.

Ю.М. Каган родился в Москве в 1928 г. В трудные годы войны юный Ю.М. Каган работал на заводе и учился вечерами в школе рабочей молодёжи. В 16 лет он поступил в Московский авиационный институт, затем перевёлся на Инженерно-физический факультет Московского механического института и окончил его с отличием в 1950 г. Параллельно сдал Л.Д. Ландау экзамены "теорминимума" и получил от него приглашение в аспирантуру. Однако был направлен на Уральский электрохимический комбинат, один из объектов Атомного проекта.

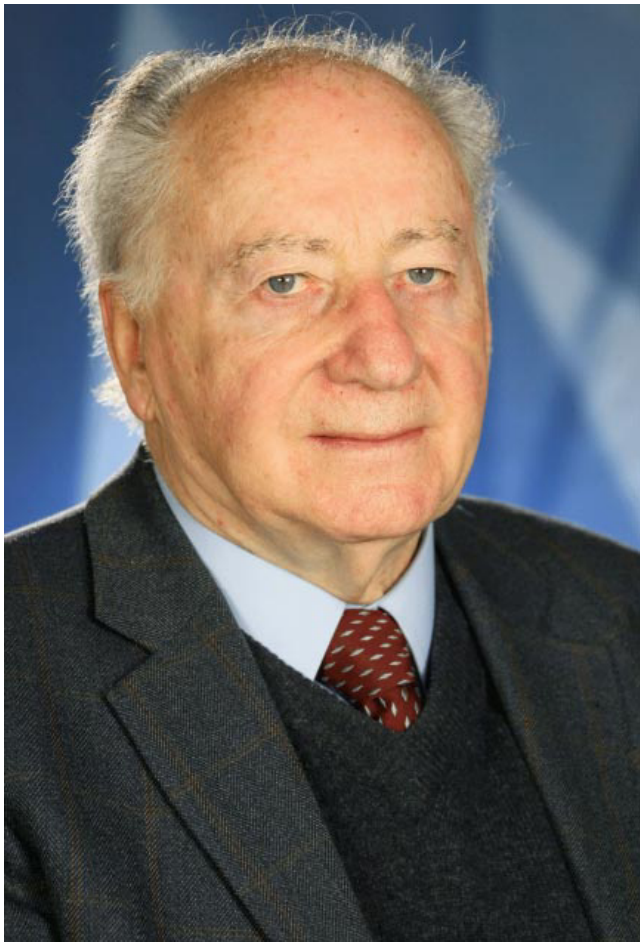
Здесь Ю.М. Каган развил общую теорию разделения изотопных газовых смесей на пористых средах. Предложил идею замены среды тяжёлым "стеночным" газом.

В 1954 г. Ю.М. Каган защитил кандидатскую диссертацию. Читал закрытый спецкурс в Уральском политехническом институте (Свердловск). В 1956 г. был приглашён в Москву, в Институт атомной энергии (ИАЭ). С того времени научная жизнь Ю.М. Кагана связана с НИЦ "Курчатовский институт". В 1959 г. он стал доктором физико-математических наук.

Здесь Ю.М. Каган создал кинетическую теорию газов с вращательными степенями свободы. Построил теорию явлений переноса во внешних полях, объяснил природу изменения кинетических коэффициентов в магнитном поле (эффект Зентфлебена). Результаты вошли в учебники, инициировали широкие исследования. Появились термины "вектор Кагана", "поляризация Кагана". Последний эффект через 25 лет наблюдался в Лейденской лаборатории.

В 1960-е годы Ю.М. Каган начал исследования по физике твёрдого тела. Развил микроскопическую теорию непереходных металлов; выявил определяющую роль электронной жидкости для их свойств. Теория объяснила природу межионных сил и предсказала появление особенностей в фононном спектре. Результаты подтверждены экспериментами.

За этот цикл работ Ю.М. Каган вместе со своим учеником и соавтором Е.Г. Бровманом получил премию им. М.В. Ломоносова АН СССР (1975).



Юрий Моисеевич Каган
(06.07.1928 – 04.06.2019)

Широко известны работы Ю.М. Кагана по металлическому водороду. Он доказал существование метастабильной фазы, проанализировал её кристаллическую структуру и колебательный спектр. Нашёл уравнение состояния, оценил давление перехода в металлическую фазу. Показал, что квазистабильны лишь анизотропные структуры и что с ростом давления проявляется тенденция к образованию жидкой фазы. Дал оценку температуры сверхпроводящего перехода при высоком давлении.

Особое место занимают исследования когерентных явлений при резонансном взаимодействии ядерного

Выступает с докладом академик Юрий Моисеевич Каган (ИАЭ им. И.В. Курчатова). Рабочее совещание "Механизмы высокотемпературной сверхпроводимости". Объединённый институт ядерных исследований (ОИЯИ), Дубна, 17 июня 1988 г., фото Ю.А. Туманова.

излучения с кристаллами. В цикле работ Ю.М. Кагана и А.М. Афанасьева возникло представление о коллективном возбуждении — ядерном экситоне. Предсказан "эффект Кагана – Афанасьева" — подавление неупругих каналов реакции, когда сильно поглощающий кристалл становится почти прозрачным. Все результаты подтверждены экспериментами и детально изучены. К этому направлению примыкает цикл работ по теории эффекта Мёссбауэра.

Предсказание и экспериментальное обнаружение эффекта подавления удостоено Государственной премии СССР (1976).

Ещё одно направление — изучение низкотемпературных квантовых явлений в конденсированных средах — инициировала классическая работа Ю.М. Кагана и И.М. Лифшица. Указано, что кинетика фазового перехода реализуется через подбарьерное туннелирование зародышей. Время жизни метастабильной фазы при абсолютном нуле остаётся конечным.

Большой цикл работ Ю.М. Кагана посвящён теории квантовой диффузии атомных частиц в твёрдом теле. Предсказан эффект самолокализации при малой концентрации частиц. Другое предсказание: при очень низкой температуре взаимодействие с фононами приводит к когерентной квантовой диффузии, снимающей локализацию.

Предсказания полностью подтверждены при экспериментальном изучении диффузии атомов ^{3}He в кристаллической матрице ^{4}He. Этот цикл работ удостоен Ленинской премии (1986). Ю.М. Каган активно участвовал и в дальнейших исследованиях квантовой диффузии частиц в металлах и сверхпроводниках.

Ю.М. Каган много занимался свойствами несовершенных кристаллов. Он предсказал появление квазилокальных уровней в фононном спектре кристаллов с дефектами и связанных с ними аномалий в термодинамических и кинетических свойствах. Это также стимулировало постановку множества экспериментов.

В последние годы интересы Ю.М. Кагана были связаны с проблемой бозе-конденсации и сверхтекучести в макроскопических квантовых системах, образованных ультрахолодными газами. Получен ряд признанных пионерских результатов. Так, решена проблема формирования бозе-конденсата и дальнего порядка из классического газа. Для систем низкой размерности продемонстрировано формирование квазиконденсата. Предсказан эффект подавления неупругих процессов при образовании конденсата. Его наблюдение в газе щелочных металлов в JILA (США) использовано как доказательство образования конденсата. Большой интерес вызвали работы по сверхтекучему состоянию газа ферми-атомов с притяжением.

Работая в Курчатовском институте, Ю.М. Каган в течение 40 лет преподавал в МИФИ. Как профессор кафедры "Теоретическая ядерная физика", он читал замечательный курс "Современная теория твёрдого тела". Он многократно приглашался для чтения лекций в ведущие университеты и научные центры мира. Ю.М. Каган вырастил большую плеяду учеников — членов-корреспондентов РАН, докторов и кандидатов наук.

Каждую неделю (практически без перерывов) с 1950-х годов Юрий Моисеевич Каган регулярно проводил семинары, на которых он выступал и сам, выступали его коллеги, ученики и соавторы, а также приглашённые специалисты и известные учёные. По воспоминаниям многих участников семинара — семинаров Кагана — это была для них та школа, в результате которой они с гордостью считают себя в некотором смысле его учениками, причём так думают даже те участники семинаров, которые конкретно мало работали с Юрием Моисеевичем (или вовсе формально с ним не работали). Эти семинары Юрий Моисеевич проводил почти до последних дней своей жизни.

Ю.М. Каган избран в 1970 г. членом-корреспондентом, а в 1984 г. — академиком АН СССР. Ю.М. Каган удостоен звания Почётного доктора Мюнхенского технического университета (Германия, 1990) и Уппсальского университета (Швеция, 1996), Почётного профессора Амстердамского университета (Нидерланды, 1990). Был избран членом Европейской академии наук (1995) и почётным членом Академии наук Венгрии (1998). Он — член Американского физического общества (1994). Ю.М. Каган дважды приглашался Гарвардским университетом читать знаменитые Моррис Лэб лекции (1988, 1996). Ему присуждены Ленинская (1986) и Государственная (1976) премии, а также Премия Карпинского (Германия 1994), Премия Гумбольдта (Германия, 1994), Премия "Триумф" (2006), Демидовская премия (2009), Премия им. И.Я. Померанчука (2017). Он награждён орденами "За заслуги перед отечеством" III степени и IV степени, двумя орденами "Трудового Красного Знамени", орденами "Дружбы" и "Почёта".

Юрий Моисеевич Каган был одним из наиболее выдающихся физиков СССР и России XX – XXI вв., обогатившим науку фундаментальными достижениями первостепенного значения. Он внёс неоценимый вклад в развитие нашей цивилизации. Мы навсегда сохраним светлую память о замечательном человеке и учёном.

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